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ABSTRACT

The monograph summarizes findings from literature concerned with instructional effectiveness and applies those findings to the education of handicapped students. Emphasis is given to the relationship between instructional variables and positive academic outcomes for students. Characteristics of effective instruction for regular education, characteristics of effective teaching programs and models, and characteristics of effective instruction for special education students are described. Particular emphasis is given to the positive effects of teachers' instructional matching, expectations, instructional and management strategies and the effect of the amount of student academic engaged time on student achievement. Among general characteristics of effective instruction identified are substantive teacher-student interaction, maximization of student success and academic engaged time, and data-based instructional planning. Programs yielding positive academic outcomes for special education students are described and include the Exemplary Center for Reading Instruction, Direct Instruction, classwide peer tutoring, cooperative learning, and the Adaptive Learning Environments Model. (Author/DB)

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University of Minnesota

MONOGRAPH NO. 4

INSTRUCTIONAL EFFECTIVENESS: IMPLICATIONS FOR EFFECTIVE INSTRUCTION OF HANDICAPPED STUDENTS

Sandra L. Christenson, Martha L. Thurlow, and James E. Ysseldyke

INSTRUCTIONAL ALTERNATIVES PROJECT

May, 1987

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Abstract

This monograph is a summary of findings from literature in the area of instructional effectiveness, specifically that literature on the relationship between instructional variables and positive academic outcomes for students. Characteristics of effective instruction for regular education, characteristics of effective teaching programs and models, and characteristics of effective instruction for special education students are described. Particular emphasis is given to the positive effects of teachers' instructional matching, expectations, instructional and management strategies, and the amount of student academic engaged time on student achievement. Implications for servicing handicapped students are discussed.

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Instructional Effectiveness: Implications for Effective Instruction of Handicapped Students

The Instructional Alternatives Project is a series of investigations aimed at assessing the effectiveness of alternative methodologies for increasing academic engaged time and academic outcomes for mildly handicapped students. The purpose of this monograph is to summarize what literature reviews and selected studies in the area of instructional effectiveness have to say, or suggest, about effective instruction for mildly handicapped students. This area is just one of many that provide a basis for characterizing the qualitative nature of instruction for handicapped students.

For the past decade, educational psychologists have paid considerable attention to the relationship between time and school learning. Building on the seminal work of Carroll (1963) and subsequent work by Bloom (1974), Harnischfeger and Wiley (1976) and Wiley and Harnischfeger (1974), researchers have conducted major investigations of the relationship between opportunity to learn (variously called academic engaged time, academic learning time, academic responding time, or time on task) and instructional outcomes. Now, in the past few years, the need to go beyond quantitative measures of engaged time to investigate what students do during engaged time (i.e., the qualitative nature of instruction) increasingly is recognized. Ours is one such effort.

Several comprehensive reviews of time research findings and issues have been written (Anderson, 1984a; Graden, Thurlow, & Ysseldyke, 1982; Karweit, 1983). In general, researchers have demonstrated: (a) school and teacher differences in time allocated to instruction exist; when aggregated over the school year, large differences between schools and classrooms in opportunity to learn in various curriculum areas result; (b) students spend a relatively small

percentage of the school day engaged in academics; (c) the percentage of time engaged varies considerably across classrooms and across individual students within classrooms, resulting in large differences between students in time involved in learning; (d) engaged time rates depend on a variety of organizational factors (classroom management, class size, interruptions), content area, and the point in time during the instructional period; and (e) engaged time is consistently though moderately related to student achievement. In addition to the tremendous variation in use of classroom time, data suggest that additional time used to make up for ineffective instruction is negatively correlated with achievement (Frederick & Walberg, 1980; Karweit, 1983).

Time-based research is criticized on several counts. First, it is said that it tends to draw attention away from the quality of learning to the quantity of time spent learning. Confrey (1981) argues that what occurs during a time period, not simply accumulation of time, is most critical for student learning. Thus, assignment of "busywork" can result in high time on task rates for students without concomitant increases in learning. Karweit (1983, 1985) criticizes time research because: (1) time appears to be at most a moderate predictor of achievement, (2) teacher, student, and classroom variation in engaged time may not be as easily altered as suggested by Bloom (1980), and (3) large increases in instructional time may be required for reasonably small changes in achievement. In her review and re-analysis of studies of engaged time and achievement, Karweit concluded that there is a consistent, but low, positive correlation ($r = .09$ to $.43$) between the two when initial ability is controlled. Thus, time and other variables share substantial common variance.

In general, time-based studies of school learning result in the overall conclusion that time is one factor, but not the sole factor, producing or

limiting student achievement. Simply stated, time is a necessary but not sufficient condition for improving student achievement. Several researchers echo the need to investigate other factors. Consider the following:

> The value of future classroom research will improve if more attention is placed upon the quality of instruction and if research becomes more integrative, examining the teacher, students, and particular curriculum tasks in specific contexts. (Good, 1983, p. 129)

> Clearly it is the quality more than the quantity of schooling which best serves as an educational and research focus. Quality of schooling includes not only time on task, but time well spent. It also includes, however, time spent on teaching practices such as encouragement, corrective feedback with guidance, small group discussions, individualization, and students involvement in their own education; but not idle praise, corrective feedback without guidance, rambling verbal interactions, busywork as a controlled device, or token student decision making. (Sirotnik, 1983, p. 26)

> We need to move beyond the now well established relation between time on task/student engagement/teacher management skills and student learning...at this point we no longer need to replicate these findings; instead we need to go beyond them in order to observe other relations. (Brophy, 1979, p. 749)

The qualitative nature of instruction has not received the attention for handicapped students that it has for nonhandicapped students. Since a primary goal of the Instructional Alternatives Project is to document the qualitative nature of instruction for handicapped students, a necessary first step was to review the relevant literature, literature that might directly address the issues related to instruction for handicapped students, or that at least would provide insights that might be relevant to students in the special education population.

In this endeavor, seven general literature areas were identified. They are as follows:

Effective Instruction
Teacher Effectiveness
Teacher Decision Making
Student Cognitions
Instructional Psychology

Models of School Learning
Effective Schools

The first area is summarized in this monograph. Other areas are summarized in other monographs. In each literature review, we identified those factors that individuals say are important or that research has documented empirically to be related to positive academic outcomes. Based upon these literature reviews, over 100 factors were generated. These factors, organized into environmental, instructional, and student characteristics, were studied and the decision was made to focus on an analysis and description of instructional factors for assessing the qualitative nature of instruction. The procedure used to develop a scale for this purpose is described in Monograph No. 1 (Ysseldyke, Christenson, McVicar, Bakewell, & Thurlow, 1986).

In this monograph, literature reviews and selected studies are summarized in the area of effective instruction. The monograph concludes with a summary of the contributions this area makes in characterizing the nature of instruction and in identifying important variables for promoting positive student learning outcomes.

Overview

Instructional effectiveness research has a long history, dating from the early studies of teaching effectiveness (see Ysseldyke, Thurlow, & Christenson, 1987). It is difficult, and at times impossible, to separate the influence of the teacher from instructional variables. In reading this literature, one discovers there are few pure "instruction" or few pure "teacher" variables related to student achievement. In fact, Good and Brophy (1984) argue that a distinction between teaching and instruction is artificial. They identify

expectations, modeling, management, and individualization/grouping as four major aspects of teaching. They also state:

> Instruction involves more than just giving demonstrations or presenting learning experiences. Instruction also means giving additional help to those who are having difficulty, diagnosing the sources of their problems, and providing remedial assistance. It means conducting evaluation with an eye toward identifying and correcting difficulties and not merely as a prelude to praising or criticizing. It means keeping track of student's individual progress, so that they can be instructed in terms of what they learned yesterday and what they should learn tomorrow. For the teacher we see that it means finding satisfaction in the progress of slower students as well as brighter ones. (p. 114)

The process of instruction includes, at a minimum, planning instruction to meet student needs, delivering instruction, and monitoring the effects of instruction to ensure that intended results have occurred.

Based on qualitative syntheses of about 3,000 studies, Walberg (1984) analyzed causal influences on student affective, behavioral, and cognitive outcomes. He identified student aptitude (ability, development, and motivation), instruction (amount and quality), and environment (home, peer, classroom, and television) as three major causal influences on student learning. He concludes that classroom learning is a function of four essential factors (student ability and motivation and quantity and quality of instruction) and four supportive factors (morale of the classroom environment, educational stimulation in the home and in the peer group, and exposure to mass media). The results of Walberg's research (1984, 1985) demonstrate the powerful influence of time and instructional quality on student learning.

This monograph begins with a discussion of several global characteristics of effective instruction, followed by characteristics of model teaching programs and the identification of specific factors that influence achievement. The

monograph ends with a description of effective instruction for special education students in resource rooms and mainstream classrooms. Since many reviews in this area have been published during the past five years, a "review of reviews" approach sometimes has been used.

General Characteristics of Effective Instruction

Based on 20 correlational or experimental studies in regular classroom settings, Stevens and Rosenshine (1981) describe the general characteristics of effective instruction. Their list of effective instruction variables, which appears in Table 1, is based on research with low socioeconomic elementary students. While "implications for special education settings are somewhat conjectural" (p. 1), Stevens and Rosenshine indicate that these characteristics are applicable to teaching basic academic skills to handicapped students. Two points need to be highlighted regarding this list of characteristics. It is critical to note that individualization refers to helping the student succeed, to achieve a high percentage of correct responses, and to become confident in his/her competence. It does not refer to the grouping arrangement in which a student works alone. Second, the demonstration-prompt-practice paradigm involves feedback. If the student makes an error, it is important to recycle instruction, that is, to follow the demonstration-prompt-practice cycle again.

Subsequent reviews of many correlational studies and seven experimental studies (Rosenshine, 1983; Rosenshine & Stevens, 1986) identified six common instructional functions that facilitate student achievement (see Table 2). According to Rosenshine (1983), to the extent that students are younger, slower, and/or have little prior background knowledge, instruction is more effective if: learning is structured; there is a brisk pace, but instruction proceeds in small

Table 1

Characteristics of Effective Instruction

General characteristics

1. Instruction takes place in groups.
2. Instruction is teacher-directed.
3. Instruction is academically focused.
4. Instruction is individualized.
5. Instruction follows a demonstration prompt-practice cycle:
    1. The most efficient process for teaching a clearly defined skill involves three steps:
        a) demonstration of the skill or presentation of the rule or general principle
        b) student practice of each of the component parts of the skill with the teacher providing prompts and corrections
        c) independent student practice with teacher monitoring for a high student success rate
    2. Guided or controlled practice (i.e., teacher asks questions while supervising in order to provide assistance and help) is continued until the student's responses are confident and accurate.
    3. A high percentage of student accurate responses given rapidly and automatically.
    4. A high frequency of direct teacher questions and a high frequency of accurate student responses in order to provide controlled practice.
    5. Group responding (i.e., Choral responding).
    6. Feedback to student:
        a) when a student makes a correct response, asking a new question to maintain the momentum of practice
        b) when a student gives an incorrect response, ask a simpler question, provide cues for the student, or re-explain
    7. Independent practice opportunities with teacher monitoring student's engagement and providing feedback.

Table 2

Rosenshine's Instructional Functions

1. Daily review, checking previous day's work, and reteaching (if necessary):

   - Checking homework
   - Reteaching areas where there were student errors

2. Presenting new content/skills:

   - Provide overview
   - Proceed in small steps (if necessary), but at a rapid pace
   - If necessary, give detailed or redundant instructions and explanations
   - New skills are phased in while old skills are being mastered

3. Initial student practice:

   - High frequency of questions and overt student practice (from teacher and materials)
   - Prompts are provided during initial learning (when appropriate)
   - All students have a chance to respond and receive feedback
   - Teacher checks for understanding by evaluating student responses
   - Continue practice until students are firm
   - Success rate of 80% or higher during initial learning

4. Feedback and correctives (and recycling of instruction, if necessary):

   - Feedback to students, particularly when they are correct but hesitant
   - Student errors provide feedback to the teacher that corrections and/or reteaching is necessary
   - Corrections by simplifying question, giving clues, explaining or reviewing steps, or reteaching last steps
   - When necessary, reteach using smaller steps

5. Independent practice so that students are firm and automatic:

   - Seatwork
   - Unitization and automaticity (practice to overlearning)
   - Need for procedure to ensure student engagement during seatwork (i.e., teacher or aide monitoring)
   - 95% correct or higher

6. Weekly and monthly reviews:

   - Reteaching, if necessary

NOTE: With older, more mature learners (a) the size of steps in the presentation is larger, (b) student practice is more covert, and (c) the practice involves covert rehearsal, restating, and reviewing (i.e., deep processing or "whirling").

Note: From "Teaching functions in instructional programs" by B. Rosenshine, 1983, Elementary School Journal, 83, 338.

sequential steps; detailed and redundant explanations and instructions are given; many concrete examples are provided; a large number of questions are asked; opportunities for overt, active student practice are provided; feedback and corrections are provided (particularly in the initial stages of learning new material); a student's success rate of 80% or higher on initial learning tasks is assured; seatwork assignments are divided into smaller assignments with increased teacher monitoring; student practice is continued to the point of rapid, automatic responses (90-100% success rate), and overlearning of skills is emphasized.

Characteristics of Effective Teaching Programs

This section describes specific instructional procedures that, when applied systematically, produce positive learning outcomes for students. Several instructional programs are described: three teaching models (Diagnostic-Prescriptive; Mastery Learning, Direct Instruction), instructional procedures used in two experimental studies (Missouri Mathematics Effectiveness Study, Texas First Grade Reading Group Study), instructional procedures in effective reading programs (ERIC), and a teacher training program (Achievement Directed Leadership).

Teaching Models

Roberts and Smith (1982) identify curriculum alignment, attention to student characteristics, use of instructional time, student success rate, and quality of instruction as essential characteristics of effective classrooms (Thurlow, Christenson, & Ysseldyke, 1987), and suggest that diagnostic-prescriptive, mastery learning, and direct instruction approaches illustrate

effective teaching models. The diagnostic-prescriptive model places primary emphasis on programming for the teacher-pupil match (Sitko & Slemon, 1983) and, as a result, consideration of student characteristics in conjunction with how content will be taught, use of instructional time, and student success rate are essential features of this model. Two clusters of student characteristics have particular impact: (1) prior knowledge, skills, and attitudes of the student (Bloom, 1976), and (2) the way a student learns (Dunn & Dunn, 1979; Letteri, 1980).

The essential characteristics of the mastery learning model are systematic instruction, small units of learning, clear mastery criteria, frequent feedback on mastery, and corrective procedures to remediate prior learning deficits and to facilitate mastery (Block, 1971; Block & Burns, 1976; Bloom, 1976). The role of prior learning is an integral part of the mastery learning model. Bloom (1976) examined prior learning in relation to variation in pre and posttest achievement scores and found that 60-80% of variance in achievement is due to prior learning. Leinhardt (1978) found that initial student performance, as measured by a test of cognitive abilities, explained 49% of reading achievement and 43% of math achievement for disadvantaged children in regular, primary grade classrooms. In fact, the sum of the four instructional processes (opportunity, motivators, structure, and instructional events) in the model of classroom processes (Cooley & Leinhardt, 1980) contributed less than prior learning in explaining achievement variation.

The mastery learning model has been the subject of much research and discussion (e.g., see Educational Leadership, 1979, No. 4) and has been used extensively in two cities, Chicago (Katims, 1979; Levine & Stark, 1982) and

Denver (Barber, 1979). In general, research has shown that mastery program students show a significant increase in achievement over non-program students. Anderson (1984b) reported that the clearest difference between mastery learning and non-mastery learning classes was in the communication of expectations (e.g., what, how, and to what level something must be learned), and the provision of feedback and correction. Applying meta-analytic techniques, Burns (1979) found both group-based and individual-based mastery approaches to be more effective than non-mastery; group-based approaches tended to be more effective than individual-based. The average effect size was .83 for cognitive and .67 for achievement. However, he found little data on effect of types of learning and types of students, concluding that mastery learning may be effective for learning certain types of materials in specific settings. Despite evidence for increased time on task and achievement with the use of mastery learning principles, critics (e.g., Arlin & Webster, 1983; Buss, 1976; Resnick, 1977) argue that achievement gains are offset by increased time demands and that fragmented knowledge and skills (rather than higher order evaluative thinking) result by breaking content into small units of learning.

Rosenshine (1976) introduced the concept of direct instruction in 1976 to represent effective teaching performance. In the past decade, direct instruction has been defined in different ways. In general, "direct instruction" refers to an academic, teacher-directed focus, little student choice of activity, large group instruction, factual questions and controlled practice, use of sequential and structured materials, and clear, understandable instructional goals. As a systematic method for presenting material in small steps and closely monitoring student understanding, direct instruction elicits

active and successful participation from all students. In sum, the direct instruction model matches instruction to students' ability and skill levels (not necessarily their learning styles), establishes congruence between classroom tasks and tasks on achievement tests, allocates sufficient and continuous time for learning, and monitors student performance, particularly for the freqeuency of correct responses.

"Direct Instruction" with capital letters refers to a carefully sequenced curriculum developed by Engelmann and colleagues (Becker, Engelmann, Carnine, & Rhine, 1981) and implemented in Project Follow Through. This approach includes the general characteristics of small "d" direct instruction, but places particular emphasis on explicit instruction on each step in the curricular sequence. Teaching problem solving strategies in a step-by-step fashion is deemed critical in order to make the thinking process leading to solutions for a particular problem obvious to students.

Cited by Pearson and Tierney (1983), Direct Intruction researchers (e.g., Becker et al., 1981) use four key principles in creating instructional programs. The first principle is: Teach the general case to make teaching and learning more efficient. Tasks that teach general case specify relevant and irrelevant features or examples of the concept. The second principle is: Errors should be kept to a minimum so less time is needed to learn new information. Tasks are carefully analyzed and sequenced so that component building blocks are taught before the general case (i.e., sound-symbol relationships before reading words in which the letter-sound corresondences occur). The third principle is: Teach the essentials. Instructional time is limited; only the essentials in a program are taught to minimize the number of examples needed to learn a concept.

The fourth principle is: Provide for adequate practice. The amount of practice necessarily varies as a function of the amount and similarity of material to learn and learning rate of the student. Effective instruction is characterized by teaching essential concepts/skills in a logical sequence to reduce errors and providing practice to the point of mastery.

The positive effect of direct instruction for students is a common, almost universal conclusion of recent research (Behling, 1986). The efficacy of the approach has been demonstrated with low income disadvantaged students and recently with special education students (Englert, 1984, Gersten, 1985; Gersten, Woodward, & Darch, 1986; Leinhardt, Zigmond, & Cooley, 1981; Reith & Frick, 1982; Rosenshine, 1977, 1979). Critics of direct instruction approaches argue that these approaches stress rote learning rather than conceptual learning. In a comprehensive review of direct vs. nondirect instructional models, Peterson (1979) concluded that selection of one model over the other needs to be based on the type of learning outcome desired and student characteristics. With regard to learning outcome, direct instructional methods produce greater achievement gains, whereas open classrooms (an indirect approach) promote more creativity and problem solving. Rosenshine (1986) discusses the effectiveness of direct instruction in relation to the objective of the content area taught. Citing the work of Simon (1973), he argues that direct instruction methods are "applicable to any 'well structured' discipline where the objective is to teach performance skills or mastery of a body of knowledge" (p. 60). In contrast, the methods are less effective for other important, but less structured, teaching areas, such as written composition, reading comprehension, and literature analysis.

Experimental Studies

Two experimental studies (Anderson, Evertson, & Brophy, 1979; Good & Grouws, 1979) are cited repeatedly in the literature as ones using effective teaching procedures. Both studies involved training teachers to use a set of specific instructional procedures that previous correlational research identified as effective in promoting academic outcomes for elementary students.

Missouri mathematics effectiveness study. Good and Grouws (1979) trained teachers to implement key instructional behaviors, referred to as the Active Teaching Model, in their teaching of mathematics. They divided 40 teachers of students in grade 4 into two groups. One group of teachers read a 45-page training manual, received two 90-minute training sessions, and proceeded to implement the specific instructional procedures that appear in Table 3. The main components of the Active Teaching Model include review, lesson development, controlled practice, checking seatwork and an integrated, relevant homework assignment. The control teachers continued to instruct students using their own styles and techniques. During the four months of program implementation, all teachers were observed six times. The percentage of time that trained and control group teachers used the targeted skills appears in Table 4. For most of the targeted skills, the trained teachers showed a higher frequency than did the control teachers. Trained teachers did not exhibit some behaviors more frequently: summarizing the previous day's materials, spending at least five minutes on lesson development and explanation, and using demonstrations during lesson presentation.

Teachers implementing an Active Teaching Model produced greater student learning gains as measured by the SRA Mathematics Achievment Test.

Table 3

Summary of Key Instructional Behaviors in the Active Teaching Approach

Daily Review (First eight minutes except Mondays)

(a) Review the concepts and skills associated with the homework
(b) Collect and deal with homework assignments
(c) Ask several mental computation exercises

Development (About 20 minutes)

(a) Briefly focus on prerequisite skills and concepts
(b) Focus on meaning and promoting student understanding by using lively explanations, demonstrations, process explanations, illustrations, etc.
(c) Assess student comprehension

    (1) Using process/product questions (active interaction)
    (2) Using controlled practice

(d) Repeat and elaborate on the meaning portion as necessary

Seatwork (About 15 minutes)

(a) Provide uninterrupted successful practice
(b) Momentum -- keep the ball rolling -- get everyone involved, then sustain involvement
(c) Alerting -- let students know their work will be checked at end of period
(d) Accountability -- check the students' work

Homework Assignment

(a) Assign on a regular basis at the end of each math class except Fridays
(b) Should involve about 15 minutes of work to be done at home
(c) Should include one or two review problems

Special Reviews

(a) Weekly review/maintenance

    (1) Conduct during the first 20 minutes each Monday
    (2) Focus on skills and concepts covered during the previous week

(b) Monthly review/maintenance

    (1) Conduct every fourth Monday
    (2) Focus on skills and concepts covered since the last monthly review

Note: From "The Missouri mathematics effectiveness project: An experimental study in fourth-grade classrooms" by T. L. Good and J. E. Brophy, 1979, Journal of Educational Psychology, 71, 357.

Table 4

Teachers' Use of Targeted Skills

Variable		Trained	Control
1.	Did the teacher conduct review?	91%*[a]	62%
2.	Did development take place within review?	51%*	37%
3.	Did the teacher check homework?	79%*	20%
4.	Did the teacher work on mental computation?	69%*	6%
5.	Did the teacher summarize previous day's material?	28%	25%
6.	Was there a slow transition from review?	7%	4%
7.	Did the teacher spend at least 5 minutes on development?	45%	51%
8.	Were the students held accountable for controlled practice during the development phase?	33%	20%
9.	Did the teacher use demonstrations during presentation?	45%	46%
10.	Did the teacher conduct seatwork?	80%*	56%
11.	Did the teacher actively engage students during seatwork (first 1½ minutes)?	71%*	43%
12.	Was the teacher available to provide immediate help to students during seatwork (next 5 minutes)?	68%	47%
13.	Were students held accountable for seatwork at the end of seatwork phase?	59%	31%
14.	Did seatwork directions take longer than 1 minute?	18%	23%
15.	Did the teacher make homework assignments?	66%*	13%

[a]An asterisk indicates a significant difference

Note: From "The Missouri mathematics effectiveness project: An experimental study in fourth-grade classrooms" by T. L. Good and D. A. Grouws, 1979, Journal of Educational Psychology, 71, 358.

Specifically, students in the trained teachers' classes had an average percentile gain of 31 from the pre- to the posttest, whereas the control group students had an average percentile gain of 19. Conducting a review (r = .37), checking homework (r = .54), working on mental computation (r = .48), holding students accountable for seatwork (r =.35), and giving homework assignments (r = .49) each were moderate, significant correlates with student math achievement. Four of the five instructional behaviors positively related to student achievement were those which trained teachers implemented with a higher frequency than did control teachers. The authors concluded that training was successful in changing instructional behavior of teachers and that the schedule of instruction, increased opportunity to practice, and continuous feedback helped to promote student progress.

Texas first grade reading group study. Anderson et al. (1979) developed a more extensive set of guidelines for first grade teachers to use during small group reading instruction in this study. Their instructional procedures, which appear in Table 5, are similar to Good and Grouws' Active Teaching Model in that both emphasize active instruction, opportunities for practice, systematic feedback, and time allocation guidelines. However, Anderson et al.'s instructional procedures include ways to deal with individual students within a group context.

The major result of the Texas study was that the experimental group had significantly higher reading achievement gains than the control group. The authors noted that the findings are in line with the concept of direct instruction (Rosenshine, 1977, 1979) and that patterns in the data suggest that systematic implementation of four principles fosters student achievement. The four principles are:

Table 5

Principles for Small Group Instruction in Beginning Reading

General Principles

1. Reading groups should be organized for efficient, sustained focus on the content.
2. All students should be not merely attentive but actively involved in the lesson.
3. The difficulty level of questions and tasks should be easy enough to allow the lesson to move along at a brisk pace and the students to experience consistent success.
4. Students should receive frequent opportunities to read and respond to questions and should get clear feedback about the correctness of their performance.
5. Skills should be mastered to overlearning, with new ones gradually phased in while olds ones are being mastered.
6. Although instruction takes place in the group setting, monitor each individual and provide whatever instruction, feedback, or opportunities to practice that he or she requires.

Specific Principles

Programming for Continuous Progress

1. Time. Across the year, reading groups should average 25-30 minutes each. The length will depend on student attention level, which varies with time of year, student ability level, and the skills being taught.
2. Academic focus. Successful reading instruction includes not only organization and management of the reading group itself (discussed below), but also effective management of the students who are working independently. Provide these students with: appropriate assignments; rules and routines to follow when they need help or information (to minimize their needs to interrupt you as you work with your reading group); and activity options available when they finish their work (so they have something else to do).
3. Pace. Both progress through the curriculum and pacing within specific activities should be brisk, producing continuous progress achieved with relative ease (small steps, high success rate).
4. Error rate. Expect to get correct answers to about 80 percent of your questions in reading groups. More errors can be expected when students are working on new skills (perhaps 70-70 percent). Continue with practice and review until smooth, rapid, correct performance is achieved. Review responses should be almost completely (perhaps 95 percent) correct.

Organizing the Group

1. Seating. Arrange seating so that you can both work with the reading group and monitor the rest of the class at the same time.
2. Transitions. Teach the students to respond immediately to a signal to move into the reading group (bringing their book or other materials) and to make quick, orderly transitions between activities.
3. Getting started. Start lessons quickly once the students are in the group (have your materials prepared beforehand).

Introducing Lessons and Activities

1. Overviews. Begin with an overview to provide students with a mental set and help them anticipate what they will be learning.
2. New words. When presenting new words, do not merely say the word and move on. Usually, you should show the word and offer phonetic clues to help students learn to decode.
3. Work assignments. Be sure that students know what to do and how to do it. Before releasing them to work on activities independently, have them demonstrate how they will accomplish these activities.

Insuring Everyone's Participation

1. Ask questions. In addition to having the students read, ask them questions about the words and materials. This helps keep students attentive during classmates' reading turns and allows you to call their attention to key concepts or meanings.
2. Ordered turns. Use a system, such as going in order around the group, to select students for reading or answering questions. This insures that all students have opportunities to participate and it simplifies group management by eliminating handwaving or other attempts by students to get you to call on them.
3. Minimize call-outs. In general, minimize student call-outs and emphasize that students must wait their turns and respect the turns of others. Occasionally, you may want to allow call-outs, to pick up the pace or encourage interest, especially with low achievers or students who do not normally volunteer. If so, give clear instructions or devise a signal to indicate that you intend to allow call-outs at these times.
4. Monitor individuals. Be sure that everyone, but especially slow students, is checked, receives feedback, and achieves mastery. Ordinarily this will require questioning each individual student and not relying on choral responses.

Table 5 (Continued)

Teacher Questions and Student Answers

1. Academic focus. Concentrate your questions on the academic content; do not overdo questions about personal experiences. Most questions should be about word recognition or sentence or story comprehension.

2. Word attack questions. Include word attack questions that require students to decode words or identify sounds within words.

3. Wait for answers. In general, wait for an answer if the student is still thinking about the question and may be able to respond. However, do not continue waiting if the student seems lost or is becoming embarrassed, or if you are losing the other students' attention.

4. Give needed help. If you think the student cannot respond without help but may be able to reason out the correct answer if you do help, provide help by simplifying the question, rephrasing the question, or giving clues.

5. Give the answer when necessary. When the student is unable to respond, give the answer or call on someone else. In general, focus the attention of the group on the answer and not on the failure to respond.

6. Explain the answer when necessary. If the question requires one to develop a response by applying a chain of reasoning or step-by-step problem solving, explain the steps one goes through to arrive at the answer in addition to giving the answer itself.

When the Student Responds Correctly

1. Acknowledge correctness (unless it is obvious). Briefly acknowledge the correctness of responses (not positively, repeat the answer, say "right", etc.), unless it is obvious to the students that their answers are correct (such as during fast-paced drills reviewing old material).

2. Explain the answer when necessary. Even after correct answers, feedback that emphasizes the methods used to get answers will often be appropriate. Onlookers may need this information to understand why the answer is correct.

3. Follow-up questions. Occasionally, you may want to address one or more follow-up questions to the same student. Such series of related questions can help the student to integrate relevant information. Or you may want to extend a line of questioning to its logical conclusion.

Praise and Criticism

1. Praise in moderation. Praise only occasionally (no more than perhaps 10 percent of correct responses). Frequent praise, especially if nonspecific, is probably less useful than more informative feedback.

2. Specify what is praised. When you do praise, specify what is being praised, if this is not obvious to the student and onlookers.

3. Correction, not criticism. Routinely inform students whenever they respond incorrectly, but in ways that focus on the academic content and include corrective feedback. When it is necessary to criticize (typically only about 1 percent of the time when students fail to respond correctly), be specific about what is being criticized and about desired alternative behaviors.

Note: From Looking in classrooms (pp. 325-327) by T. L. Good and J. E. Brophy, 1984, New York: Harper and Row.

1. Students achieve more when they are given greater opportunity to learn. High achieving students' teachers spent more time with them during the instructional presentation, and covered more content. High achieving students had higher rates of time on task during seatwork follow-up activities.

2. Students achieve more when they are given opportunities to practice skills correctly. High achieving students' teachers monitored their understanding, provided feedback, and adjusted the lesson accordingly. They were concerned about turning student errors into learning experiences. Achievement was influenced by the frequency of direct teacher questions and the frequency of accurate student responses.

3. Students achieve more when teachers provide explicit information about the structure of skills, rather than focusing only on memorizing rules or labels. High achieving students' teachers used overviews, provided sustaining feedback (i.e., cues provided and student given a second chance to answer) and process feedback (teacher explains to student how to figure out answers) following errors, and used task-specific praise or criticism.

4. Students achieve more when classrooms are well managed. The underlying management structure of the classroom influences students' opportunity to learn, opportunities for quality practice, and teachers' monitoring and feedback.

In summary, the three-step instructional process, demonstrate-prompt-practice, was successful in achieving student gains in these two studies. Teachers were instructed to demonstrate the skill to the whole group, supervise students and provide prompts as they worked through examples, and provide time for independent practice without direct teacher supervision but ongoing monitoring. Teachers monitored student responses during independent practice; when errors were made, demonstration and guided practice (supervised practice) were repeated.

Effective Reading Programs

Samuels (1982) compared seven studies that examined factors contributing to reading achievement gains for students, particularly low achieving or low

socioeconomic students. He found that successful reading programs are characterized by strong administrative instructional leadership, a task and human relations orientation, increased instructional time, high rates of engaged time on relevant reading activities, efficient management, and monitoring of student performance through frequent testing and observation. Teaching of clear and specific objectives was more important than the specific material or method (e.g., phonics vs whole word approach) used. This latter finding is consistent with the findings of the Exemplary Center for Reading Instruction (ECRI) (Reid, 1981, 1986).

Based on the conclusion that the teacher has a greater effect on student achievement than do materials, ECRI techniques emphasize the importance of a brisk teaching pace and specific error correction procedures. While ECRI is based on principles from the diagnostic-prescriptive, direct instruction, and mastery learning approaches, its defining characteristic is the use of specific techniques for eliciting student overt responses, particularly accurate responses. ECRI instructional procedures concentrate on student responses in two ways. First, specific cues/prompts and carefully sequenced questions are used during the instructional presentation to increase the accuracy of the student's response, while maintaining a brisk instructional pace. Second, specific correction procedures are used following student errors. Students are led to the correct answer (sustaining feedback), retaught (process feedback), and given opportunities to answer correctly several times before terminating the lesson. Terminal feedback (student is provided answer by teacher or another student) is not used. The effectiveness of ECRI instructional procedures for increasing the reading achievement of handicapped and nonhandicapped elementary

school students is well documented (Reid, 1981, 1986). In general, students placed in ECRI classrooms make twice the reading gain of students taught by traditional, basal-oriented methods, which rely heavily on students working exercises and completing reading passages from textbooks and workbooks. Commercially prepared materials are often poorly designed and written, resulting in students' difficulty learning the content because of text confusions not because of the basic skill being mastered (Doyle, 1983). The role of the teacher is essential to the effectiveness of ECRI procedures.

Teacher Training Program

The Achievement Directed Leadership Programme (ADLP), developed by Research for Better Schools, provides educators with a training program on the use of research on student engaged time in order to improve instruction (Huitt & Caldwell, 1984). ADLP focuses on four classroom teaching and learning variables: level of prior learning, student engaged time, coverage of criterion content, and daily student academic performance. The training program instructs teachers in the importance of four instructional events (presentation, practice, feedback, and monitoring) to improve the quality of students' learning (see Table 6). While only preliminary data are available, the use of a four-stage instructional improvement cycle suggests that in those classes taught by teachers who implemented the procedures of ADLP, changes in student engaged time occur, teachers report changes in their teaching practices, and increases in student engaged time are related to increases in elementary students' achievement on standardized tests.

In summary, effective teaching programs depict the teacher as active and are representative of "direct instruction" (Gersten et al., 1986).

Table 6

Instructional Events

PRESENTATION -- Introduce, develop, or review concepts and skills

- Review
- Overview -- what, why
- Explanation
- Student demonstration of understanding

PRACTICE -- Strengthen, apply, or give additional experience with concepts and skills

- Guided or controlled practice
- Independent practice

FEEDBACK -- Let students know whether their answers were right or wrong and why

MONITORING -- Assess and maintain student's knowledge and application of concepts and skills

- Daily work (including new and review content)
- Unit or topic tests

Note: From "Time and instructional improvement: An r- and d-based approach" (p. 219) by W. G. Huitt and J. H. Caldwell, 1984. In L. Anderson (Ed.), Time and school learning. New York: St. Martin's Press.

Specifically, the teacher presents the lesson by interacting with and eliciting many correct answers from students. The teacher ensures adequate guided practice, provides ongoing feedback, and carefully monitors student performance.

Factors That Influence Achievement

Centra and Potter's (1980) organizing framework is helpful for making sense of the number and range of factors identified as academic correlates. A sampling of factors in their suggested categories of student, environmental, and instructional characteristics appears in Table 7. The factors were selected for inclusion in the table if they appeared repeatedly in the literature. The focus of this section is on instructional factors that influence student achievement. Those repeatedly mentioned in recent reviews of the literature (e.g., Brophy & Good, 1986; Fisher & Berliner, 1985; Rosenshine & Stevens, 1986) are described.

Academic Engaged Time

High rates of academic engaged time or time on task have consistently been identified as a component of effective instruction (e.g., Anderson, 1984a; Good, 1983; Karweit, 1983, 1985). However, the relationship between instructional behaviors and high rates of time on task is complex and difficult to understand. It varies according to behavioral setting, teaching methods, student characteristics, and teaching practices. Anderson (1984b) reviewed Kounin and Gump's (1974) findings that time on task is lower in whole class recitations than in small teacher-led groups and lower for student-paced activities (i.e., self-paced) than for teacher-paced (i.e., externally-paced) activities. In addition, variety is associated with a high level of time on task in seatwork settings, but not in recitation settings. Classrooms with lower amounts of

I. Student Characteristics Said to Be or Shown to Be Related to Student Outcomes

- Cognitive and affective entry behaviors
- Abilities (cognitive, psychomotor, psycholinguistic...)
- Affective characteristics (temperament, self-concept, attention...)
- Prior learning or knowledge
- Level of skill development
- Ability to understand instruction
- Motivation
- Task persistence
- Learning rate
- Time needed to learn
- Attentional set
- Individual differences in locus of control, achievement motivation, cognitive style, conceptual tempo, anxiety, attribution patterns, attitudes, etc.
- Learning styles
- Cognitive types
- Naturally-occurring pupil characteristics (race, sex, physical appearance, etc.)

II. Environmental Factors Said or Shown to Be Related to Student Outcomes

School District Conditions
- Millage rate
- Teacher-pupil ratio
- Extent to which there is an emphasis on basic skills
- Amount of homework
- Emphasis on test taking (including minimum competency testing)
- Process by which the curriculum is developed
- Attendance

Within-School Conditions
- Class size
- School ambiance
- Extent to which the school climate is free from discipline problems
- Leadership from the principal
- Cooperative environment
- Collaborative staff relations
- Degree of structure
- Clarity of classroom rules and procedures
- Academic focus; high expectations

General Family Characteristics
- Status characteristics (SES, income level, educational level, occupation)
- Use of out-of-school time
- Peer group outside the school

III. Instructional Factors Said or Shown to Be Related to Student Outcomes

Planning Procedures
- Sufficient time allocated to academic activities
- Quality of the teacher's diagnosis of student skill level
- Prescription of appropriate tasks that are clearly matched to student skill level
- Realistic, high expectations and academic standards
- Instructional decision making practices (grouping, materials, ongoing diagnostic ability)
- Sufficient content coverage
- Instruction is designed to include lesson presentation, practice, application, and review
- Kind of curriculum

Management Procedures
- Efficient classroom management procedures
- Well established and efficient instructional organization and routines
- Productive use of instructional time
- Positive, supportive classroom interactions

Teaching Procedures
- The instructional sequence includes demonstration, prompting and provision of opportunity for practice
- Expectations (goals, objectives, academic standards) are communicated clearly
- Lesson Presentation - Related Factors:
    - Extensive substantive teacher-pupil interaction, teacher questioning, signaling, re-explaining
    - Teacher-directed instruction (proceeding in small steps, careful structuring of learning experiences, etc.)
    - Clear demonstration procedures and systematic use of error correction procedures
    - High rate of accurate student response
    - Amount of guided practice prior to independent practice
    - Explicitness of task directions

- Practice - Related Factors:
    - Amount and kind of independent practice
    - Appropriateness of seatwork activities
    - Systematic application of principles of learning to instruction
    - High rates of academic engaged time (academic learning time; opportunity to learn)
    - Brisk, fast pacing (curriculum and lesson)
    - Degree of student accountability
    - Systematic, explicit feedback and corrective procedures

Monitoring and Evaluation Procedures
- Active Monitoring of seatwork activities
- High success rates (on daily and unit tests)
- Frequent, direct measurement of pupil progress
- Progress through the curriculum depends on mastery criteria
- Curriculum alignment (the relationship between what is to be taught [goals], what is taught [instruction], and what is tested [assessment])

time on task have been characterized by a variety of activities occurring simultaneously or by the majority of students working alone.

In a study conducted by Anderson and Scott (1978) and reported by Anderson (1984b), the relationship among teaching methods, students' verbal ability, students' academic self-concept, and students' time on task was investigated. They found that different teaching methods are differentially useful for different types of students. For example, lecturing and the use of films and filmstrips (i.e., one-way communication methods) are associated with higher levels of time on task for students with higher abilities. In contrast, teacher-directed methods in which students participate by responding to and raising questions (i.e., two-way communication methods) are associated with high levels of time on task for all types of students. Teaching methods that place the responsibility on the student for use of time, such as seatwork, are associated with high levels of time on task for students with positive academic self-concepts, but with lower levels of time on task for students with less positive academic self-concepts.

In a review of the relationship between instructional variables and amount of time on task, Anderson (1984b) discusses the contributions of five major research approaches that have studied time on task. The key instructional elements for maximizing student engaged time from Ecological Psychology, Learning From Mastery, Survival Skills, Beginning Teacher Evaluation Study, and the Follow-Through Evaluation research appears in Table 8.

The key instructional element for high levels of time on task, as identified by ecological psychology, is continuity of signal systems both across and within classroom activities. Continuity results from the behavior setting

Table 8

Key Instructional Elements for Increasing Academic Engaged Time

Research Approach	Instructional Element
Ecological Psychology	• Continuity of signal systems
Learning for Mastery	• Communication of expectations
	• Feedback and correctives
Survival Skills	• Reinforcement of:
	1. Attending
	2. Work
	3. Volunteering
	4. Compliance
Beginning Teacher Evaluation Study	• Monitoring
	• Task appropriateness
Follow Through Study	• Instruction is continuous and active
	• Goals are clear to students
	• Immediate, academically-oriented feedback
	• Structured tasks
	• Reinforcement and praise
	• High success rates
	• Sufficient time allocated to instruction

Note: From "Instruction and time-on-task: A review" (pp. 143-163) by L. Anderson, 1984. In L. W. Anderson (Ed.), Time and school learning. New York: St. Martin's Press.

itself, the behaviors of the teacher within the setting, or from the pacing of the lesson. Behavior settings that have "holding power" contain clear indicators of something being accomplished as a result of the student's behavior (e.g., groups of students reading in unison, activities being demonstrated, students working on material in individual construction activities). The results of the time-based research within the learning for mastery framework specify communication of expectations and feedback and correctives as key instructional activities. Communication of expectations includes what is to be learned, how it is to be learned, to what level it must be learned, as well as the teacher's expectations for use of time.

Anderson cites a series of survival skills studies conducted by Cobb (1972) as evidence that reinforcement is the critical instructional variable for increasing engaged time. Cobb's research was based on the assumption that reinforcing four survival skills, attending (paying attention to the instruction), work (engaging in task completion behaviors), volunteering (indicating a willingness to participate), and compliance (doing what the teacher asks to be done), would increase time on task and subsequently achievement. Teachers in the experimental group were taught to use several types of reinforcement (e.g., close monitoring, shaping procedures, social reinforcers), while the control group teachers received no specific training in this area. In three experimental studies, time on task increased through the appropriate use of reinforcement. In two of the studies, increases in time on task resulted in increases in achievement on standardized, norm-referenced achievement tests.

Monitoring and task appropriateness are the two key instructional variables for increasing time on task that emerge from the findings of the Beginning

Teacher Evaluation Study (Denham & Lieberman, 1980). Monitoring refers to active monitoring of students' practice activities for both task completion and accuracy of response. Classrooms in which time on task was high were characterized by communication of the value of learning and successful practice. The value of learning was communicated to students by teachers clearly stating expectations concerning the completion of work to a specific standard of quality and by holding students responsible for their work. Successful practice was facilitated by students working on tasks that were at the appropriate level of difficulty. According to Anderson, findings from the Follow Through Study (Stallings, 1975) reiterate the importance of the instructional elements identified by the four other research approaches.

In summary, Anderson believes that effective instructional practices increase student engaged time, which in turn, increase student achievement. His viewpoint is congruent with Karweit's (1983; 1985) belief that student achievement depends both on appropriate instruction and student attention to an appropriate task. He cautions that a misapplication of time on task research findings occurs when the focus is on "time" at the exclusion of "on-task."

Doyle (1983) offers an important distinction between time on activity and time on task. When activities or materials used by students in classrooms are unrelated to the attainment of learning goals or instructional objectives, the student is spending time on activity, but not time on task; this time will most probably not result in task accomplishment and student achievement gains. The central issue is not simply the time, but the nature of the task. The tasks must be efficient means to achieving the intended instructional objectives. A task refers to a goal-oriented set of activities specifically intended to produce a particular learning outcome (Posner, 1982).

Anderson (1984b) believes that monitoring student attention and learning is essential. Monitoring has two purposes: (1) to maintain the attention or task orientation of students, and (2) to check on the effectiveness of the student's learning vis-a-vis the instructional objectives. The moderate relationship between achievement and student engaged time may be attributed to "too little" monitoring, which includes feedback, correctives, attention to task, student accountability, and task accuracy.

Instructional Match

A critical teacher decision-making task is solving what Hunt (1961) has referred to as "the problem of the match" -- how to match both the difficulty level and interest level of materials and assignments to skill level and interest of a student. The problem of the match is greater when a student differs from the "average" students for whom the curriculum is intended. Brophy and Evertson (1976) indicate that teachers need to supplement or substitute for the curriculum in order for some students to succeed. "The aim of good matching has been referred to as avoiding the twin pitfalls of demanding too much and expecting too little" (Bennett, Desforges, Cockburn, & Wilkinson, 1984, p. 41).

In a major study of the quality of the learning environments provided by 16 teachers of 6- and 7-year-old students (Bennett et al., 1984) the match of instruction to students' needs was examined. Analysis of the students' work, the students' strategy for completing the work, and the teachers' interpretation of the student's performance were used in determining appropriateness of match. Less than half of the tasks were matched to student need; low achievers' levels were overestimated on 44% of the tasks; tasks involving the acquisition of new facts, skills, rules, or procedures were more frequently matched appropriately

than practice tasks. The appropriateness of the task was not indicated by the student's distractable behavior, turning to friends for help, or looking unhappy. Exclusive use of student error rate as an indication of match was discouraged because it does not address what the student has learned through the instructional process or the relationship of match to the stage of learning (new task, practice, review).

In their discussion of match as a critical instructional variable, Good and Brophy (1984) identify three aspects of a good student-instructional match. First, the difficulty level of the instructional materials and assignments influences student persistence on tasks. Within the Beginning Teacher Evaluation Study framework, diagnosis and prescription are two teaching functions necessary for an appropriate match. The teacher's ability to diagnose a student's skill level (particularly as measured by the teacher's accuracy in predicting how each student would perform on certain tasks) and observers' ratings of task appropriateness (as measured by rating whether instruction generally matched needs and skill level of individual students) were related to student achievement and academic learning time. Academic learning time is the time students spend engaged in academic tasks that they complete with high success rates (Fisher, Berliner, Filby, Marliave, Cahen, & Dishaw, 1980).

A positive relationship was found between a teacher's diagnostic ability and the reading and mathematics achievement of elementary students; when teachers were more successful in estimating items students would answer correctly, their students tended to perform better on tests. Item prediction was used as a measure of how well the teacher knows what the student can or cannot do. The diagnostic ability of the teacher also was related positively to

student engagement and related negatively to low success rate. The positive relationship between appropriateness of prescription and student achievement was partly influenced by the relationship between task appropriateness and academic learning time. Since appropriateness of prescription was related to the proportion of time students had success on their work, higher ratings of appropriateness were associated with less frequent occurrences of very hard material.

Second, teachers need to consider adapting instructional materials to student interest in order to achieve a good match. According to Good and Brophy (1984), motivation is increased when learning is personally relevant. Students respond better when lessons are related to one another rather than presented as isolated and meaningless activities. Third, students' engagement rates can be used as an indication of a good match. High engagement in seatwork tasks is associated with better performance on tasks and with better learning over the course of the school year (Cobb, 1972; Fisher et al., 1980). Frequent monitoring of student involvement is critical for assuring a good match; according to Good and Brophy, "successful teachers systematically check the work of low achievers" (1984, p. 333). Teacher adjustment of the curriculum increases student opportunity to learn, is an important determinant of what is actually learned, and is seen as a major vehicle for ensuring active student participation. In fact, Good and Brophy suggest that 20-50% of the school day be spent in recycling work with low achievers and enrichment work with high achievers. Like Bennett et al. (1984), Good and Brophy identify multiple indicators of a good match. They suggest that low engagement during independent work activities, high rates of error, and frequent failure to complete assignments are the result of a poor match.

Research on the effects of adaptive education indicates that it greatly improves student learning. Waxman, Wang, Anderson, and Walberg (1985) conducted a systematic quantitative analysis of 38 studies conducted over a 10 year period and involving 7,200 students in various content areas and grade levels. Adaptive education programs inlcuded in this research synthesis contained at least one of the following characteristics of adaptive education: (1) instruction is based on assessed skills of each student, (2) students work at their individual pace, (3) students are informed regularly about their mastery of material, (4) students plan and evaluate their own learning, (5) alternative materials and activities are used to help student mastery skills, (6) students have a choice of goals and activities, and (7) students help one another to achieve individual and group goals. According to the authors, adaptive instruction consistently has positive effects on students' cognitive, affective, and behavioral outcomes despite considerable differences in program features, social context, grade level, or type of students. The mean study-weighted effect size for the 38 studies was .45, suggesting that students in adaptive instruction programs scored on the average at the 67th percentile, while students in the control group scored at the 50th percentile. The authors state that the "synthesis suggests that tailoring instruction to respond to the learning characteristics and needs of individual students can be more effective in obtaining intended social and academic outcomes" (p. 29).

Assignments/Task Characteristics

There are several concerns identified within the literature related to assigned tasks. First, teachers make many assignments, but these assignments frequently involve activity for its' own sake (i.e., "busy work") rather than a

task with a clear goal or outcome. Durkin's (1984) observations of 16 teachers of first, third, and fifth grade students during reading instruction concluded that reading assignments were used more to control students than to teach students. During this observational study involving two hours during reading instruction, Durkin noted that teachers spent little or no time on new vocabulary words, background information, or teaching students to pre-read comprehension questions. In contrast, a lot of time was spent on having students answer teacher-directed questions and on workbook pages. There was a striking similarity across grade level work in terms of preparing students to do assigned work. Durkin argues that a goal-oriented set of activities intended to produce a particular learning outcome is necessary to improve reading comprehension of all students, and in particular of low-achieving students.

Second, tasks must be selected with an individual student's learning rate and prior knowledge in mind. According to Gettinger (1984a), while various models of school learning (see Christenson, Ysseldyke, & Thurlow, 1987) are conceptually grounded in Carroll's model, research has emphasized time spent in learning. Time spent has been documented as a necessary condition for learning; however, research has seriously omitted the "time needed" factor. This omission may be due in part to difficulties in measuring time needed to learn. She states, "What is lacking in most research on time spent and achievement is clarification of task conditions and/or learner characteristics for which more time spent <u>does</u> produce more learning" (p. 20). Recognized as an instructional paradigm that considers both factors, Bloom's model (1980) sets the degree of learning at an acceptable criterion level and varies the time and instructional methods according to the student's needs until mastery is achieved. Gettinger

hypothesizes that time needed and time spent may interact to predict achievement outcomes. She believes that time needed to learn measures "may provide the missing link underlying the "sufficiency" aspect of the relationship between time and learning" (p. 26).

Gettinger has engaged in a series of studies measuring time needed to learn. In one study, Gettinger (1984b) investigated individual differences in the number of learning trials to reach criterion on training words during phonics instruction on two short vowels; the extent to which this measure of learning rate during training was related to learning outcome (i.e., retention and posttest performance) was the variable of interest. Thirty-six children with IQs between 76 and 104 served as subjects while attending a camp for students with learning and behavior problems. All children were successful in learning the 16 training words at the end of nine days of instruction; however, those children with poor initial learning rates experienced less success in reading transfer words on the posttest and evidenced poorer retention on the training words.

In another study (Gettinger, 1984c), the causal effects of time spent and time needed for learning on reading and spelling achievement were investigated with fourth and fifth grade students in regular classes. Time needed to learn was measured by counting the number of learning trials taken to reach mastery when no task specific feedback was provided. Time spent in learning was measured by the number of trials determined by the student as needed to achieve 100% accuracy. The four measures of achievement included a standardized test, teacher assigned grades, and criterion tests for material learned (one measured accuracy, the other retention two days later). Results indicated that time

needed contributed significantly to learning. On the average about 91% of the explained variance in learning was accounted for by time needed compared to approximately 7%, on the average, for time spent.

Gettinger and Lyon (1983) examined the discrepancy between time needed and time spent in learning with 96 boys who were referred to a summer camp because of classroom behavior problems. This investigation sought to identify specific variables that might predict discrepancies between time needed and time spent. The behavior problems were related to attention deficits, disruptive classroom behavior, low frustration tolerance, or low self concept. The boys' mean age was 9-9 years. As measured by the Peabody Picture Vocabulary Test and the Wide Range Achievement test, IQ and reading achievement, respectively, were average. As a measure of time needed for learning, the boys were required to read a fourth or fifth grade level science or social studies passage until 100% accuracy was achieved on a multiple-choice criterion test tapping factual comprehension. Self-regulated learning trials in which re-reading was stopped when they believed the material had been mastered was used as a measure of time spent. Spending less time than needed resulted in a lower retention level. The authors found the best single predictor of the discrepancy between time needed and time spent was reading achievement, which accounted for 36% of the explained variance. Low reading achievement was related to large discrepancies in the two time variables on reading tasks and retention scores. Consistent with Bloom's (1976) emphasis on academic entry characteristics, past reading performance was a good predictor of future performance. Noncognitive characteristics (e.g., locus of control, low self-concept, interest level) together accounted for a smaller (17%), but significant percentage of explained variance in time needed

and time spent discrepancies; attention deficits also accounted for a significant amount of variability (10%). The results underscore the importance of identifying children who are likely to spend more or less time engaged in learning than needed. The authors note the importance of student motivation; some students may limit their task time rather than set their goal at 100% accuracy and persevere to meet their goal.

In summary, Gettinger and her colleagues discuss time needed to learn measures as viable predictors of student achievement, often measured by retention and application of learned material. Evidence exists for the importance of student entry characteristics, particularly prior skill level, in explaining obtained time needed-time spent discrepancies. The level of students' prior learning consistently explains a substantial portion of achievement variation for regular (Bloom, 1976; Leinhardt, 1978) and special education (Haynes & Jenkins, 1986) students.

A third point related to assigned tasks is that to learn efficiently, students must be engaged in tasks at an appropriate difficulty level. Varied success rates appear in the literature. Good and Brophy (1984) indicate that advocates of mastery learning approaches expect at least 80% success rates on assigned work, advocates of programmed learning expect success rates to approach 100%, and recent classroom research indicates that teachers who program for success rates of 90-100% on assigned work produce greater learning.

Success rates for particular activities vary with the nature of the activity, the availability of the teacher to monitor student progress, and the provision of corrective feedback (Rosenshine & Stevens, 1986). For example, during a new lesson presentation in the whole group setting where the teacher is

available for immediate corrective feedback, the lesson objectives may be achieved even if the bright and successful student is able to answer only about 70% of teacher questions accurately. However, a success rate of 80% is preferred for less confident or less successful students during presentation of new material. On review lessons and independent practice lessons during seatwork, a very high success rate (i.e., 90-100%) is required to prevent students, particularly low achieving students from giving up on an assignment only later to become "motivation problems."

Chow (1981), in an extensive descriptive study, compared academic learning time for nonhandicapped and mildly learning disabled students in mainstream classrooms. Several observations were conducted in fifth and sixth grade math classes over a two year period. He found significant differences between the groups on the amount of time engaged on successful tasks. Learning disabled students had significantly more engaged time with a low success rate, while nonhandicapped students had more engaged time at a high success rate. No significant correlations were found between academic learning time variables and achievement for learning disabled students, suggesting that these students were not exposed to appropriately designed learning tasks.

Fourth, cognitive psychologists emphasize that the student's interpretation of the tasks and their subsequent task engagement determine what and how much they learn (Thurlow, Ysseldyke, & Christenson, 1987). According to Posner (1982):

> If we want to understand a student's experience, the process of learning, and the reasons why some learning outcomes are occurring and not others, we must first understand the tasks in which students are engaging and not just the tasks the teachers think they are 'giving' to students. (p. 343)

Students shape their tasks on the basis of what they bring to the tasks as presented. They shape these tasks as a result of many factors, including interpretations of the present situation in relation to their background and past experience, the resources available, the benefits of task engagement, their purposes for being in the situation, and the amount of ambiguity of the task.

Knowledge of the criterion task and instructional goal increased special education students' engagement in task-appropriate learning activities and positively influenced the amount they learned (Wong, Wong, & LaMare, 1982). Concluding that it is important to inform students of the rationale, objectives, and expectations when assignments are made, the authors state:

> What the teacher intends the children, in particular, learning disabled children, to learn or accomplish at the end of studying or working on a given assignment should be clearly conveyed to the children. Instructions such as, 'Read carefully the assignment' are insufficient in inducing appropriate learning activities in children. To promote optimal learning, teachers must inform students of the specific objectives in the assignment. (p. 126)

Several researchers believe that students' interpretation of tasks (e.g., Posner, 1982; Tobias, 1982) or actual task demands (Bennett et al., 1984) also determine the quality of the student's learning experience. Comparison of the task demands with the teacher's stated intention showed that 30% of the mathematics tasks and 20% of the language tasks did not carry the teacher's intended demand. This occurred most frequently with high achievers (Bennett et al., 1984).

Fifth, tasks that are presented with enthusiasm, and in an interesting way influence student participation and achievement. Two aspects of enthusiasm, teacher interest in the subject and teacher vigor and dynamics (e.g., voice inflection) result in higher student attention and greater student achievement

(Good & Brophy, 1984). Using a variety of teaching methods and materials is important for maintaining student interest and attention and ultimately for producing higher achievement. Good and Brophy (1980, 1984) believe that students' reactions to academic activities/tasks is influenced by the way teachers initially present the activities and talk about them. Teachers who present tasks by stressing positive expectations, such as knowledge as skills the task will provide students, are thought to be better received by students than tasks presented with little enthusiasm.

Brophy's (1983b) initial work on student motivation in the classroom suggests that teachers could present tasks more positively to students. Observations were conducted in six 4-6 grade classrooms and observers recorded teachers' presentation statements about tasks. Teachers made a variety of task presentations; the 249 presentation statements, were categorized into neutral, positive or negative student expectations about tasks. Teachers simply launched into tasks without describing them in 68 instances. For the 317 task introductions, teachers made no introduction 21% of the time, made a neutral statement 29% of the time, introduced the task in positive terms 25% of the time, and provoked negative expectations 25% of the time. Teachers created expectations for tasks only half the time, and the frequency of positive expectations was equal to that of negative expectations. Brophy concludes that teachers are "not doing nearly as much as they could do to foster intrinsic motivation (or continuing motivation) in their students for the knowledge and skills they were learning at school" (p. 301).

Practice

Two forms of practice, guided and independent (see Table 2), are essential teaching functions identified by Rosenshine and Stevens (1986) and described by Rosenshine (1986) as aspects of explicit instruction. A number of correlational studies reported by Rosenshine (1986) have shown that students make greater academic gains when teachers provide increased guided practice, particularly by asking many questions (Anderson et al., 1979; Good & Grouws, 1979; Soar, 1973; Stallings & Kaskowitz, 1974). Two types of questions are asked during successful guided practice. Those calling for a specific answer (product question) and those calling for an explanation of how an answer was found (process question). In these studies, frequency of practice, percentage of answers students give correctly, and students' active participation are important factors during guided practice. Students, particularly low achievers, need a good deal of practice and need to actively practice and process when learning new material. By the end of the guided practice, students are expected to perform the steps accurately, but slowly and hesitantly. Independent practice provides the additional practice students need to be fluent or reach automaticity. Automaticity and fluency of facts, skills, and concepts used in subsequent learning are essential so students' attention can shift to comprehension and application (Samuels, 1981). Effective independent practice is on the same material as guided practice.

Students are more engaged during seatwork when the teacher spends more time in guided practice and when the teacher actively monitors independent seatwork by circulating throughout the room and supervising students' work (Fisher et al., 1980). Lengthy explanation during independent seatwork is negatively

associated with engaged time and student success rates. Rosenshine (1986) considers lengthy explanations during seatwork as indicative that initial teacher modeling and guided practice were inadequate and insufficient.

Research shows that students achieve more when they help each other during independent seatwork (Slavin, 1980). Some of the advantage of cooperative learning settings presumably comes from students having to explain the process or answer (Webb, 1982).

Explicit instruction is viewed by Rosenshine (1986) as a process of teacher modeling, through guided process using prompts and cues, to independent and fluent practice. He believes this process can be and should be modified to suit different students. To the extent the student learning rate is slower, the student needs more review, less presentation and more guided and independent practice. To the extent the student's learning rate is faster, the student needs less review, more presentation, and less guided or independent practice, which can often be given as homework.

While homework has been designated as a neglected research area, several studies tend to support the view that regularly assigned and checked homework, which is related to the daily lesson, enhances student achievement (e.g., Coulter, 1979; Good & Grouws, 1979; Walberg, Paschal, & Weinstein, 1985). Homework appears to be valuable because it provides distributed practice on the skills being learned. Research is needed on the effectiveness of different kinds of homework and the appropriate amount of homework for different types of students (Brophy, 1986).

Opportunity To Learn

Opportunity to learn is related to student achievement and is measured in various ways, including content covered (Borg, 1979; Good, Grouws, & Beckerman, 1978), percentage of test items taught through lecture and recitation (Cooley & Leinhardt, 1980; Dunkin & Doenau, 1980), and students' active responding time or opportunity to respond (Greenwood, Delquadri, & Hall, 1984). Influenced by the length of the school day and school year (Harnischfeger & Wiley, 1985), opportunity to learn is determined by four instructional variables: time allocated to academic activities (Fisher et al., 1980; Stallings, 1975), classroom management (Brophy & Evertson, 1976; Brophy & Good, 1986; Fisher et al., 1980; Good & Grouws, 1979), consistent student success and academic learning time (Fisher et al., 1980), and active teaching (Good & Grouws, 1979; Stevens & Rosenshine, 1981).

Pace refers to progress through the curriculum, number of words per lesson, number of pages taught per lesson, asking more questions, or presenting learning trials more quickly. It is a determining characteristic of direct instruction programs. Maintaining a brisk pace and a high rate of progress through the curriculum produces greater academic gains (Englert, 1984; Rosenshine, 1983).

Leinhardt et al. (1981) examined the relationship between specific instructional practices and reading outcomes in special day classes for elementary learning disabled students. Teachers structured the learning environment to influence how students spent their time; the amount of time spent directly on silent reading was most strongly associated with reading achievement. Variables associated with increases in reading proficiency result in increased time allocated to direct, active reading instruction and include:

decrease in transition time, classroom management activities, and indirect reading instruction, such as talking about the story or relating the story to personal experience.

Opportunity to learn, particularly in basic skills areas (most often reading) for handicapped learners, can be viewed as a function of the amount of time allocated to instruction in the resource room and mainstream classroom. In an observational study of reading for fourth, fifth, and sixth grade mildly handicapped students, Haynes and Jenkins (1986) found that resource time combined with regular classroom time provided handicapped students with comparable reading time as their nonhandicapped peers. In addition, the nature of reading instruction and reading activities was similar in both settings. They argue that special education services, based on an "equal opportunity" model as opposed to a "catch-up" model, may supplant not supplement the classroom reading program. For resource room instruction, they found extensive variability in time schedules for instruction, and for how time was allocated to different reading tasks. In addition, these decisions were often more influenced by school context variables (e.g., scheduling constraints) than student characteristics (e.g., achievement level). In sum, the student's opportunity to learn or the level of instruction provided mildly handicapped students was insufficient to close the gap between handicapped and nonhandicapped peers. Similarly, Allington, Stuetzel, Shake, and Lamarche (1984) found participation of 27 remedial reading students in Chapter I services did not provide students with additional time for reading instruction. Their finding that remedial instruction did not increase on-task behavior was attributed to several factors: little curricular congruence between materials

and strategies used in regular and remedial reading classrooms, unclear goals, little or no monitoring for advancement toward goals, missing directed activities in the mainstream, and less seatwork time to complete assignments. The authors agree with Zigmond, Vallecorsa, and Leinhardt (1980) that a greater proportion of time needs to be allocated for teacher directed reading and time taken for classroom management and nonacademic activities must be reduced and reallocated to direct reading activities.

Classroom Management

Several studies underscore the importance of establishing a classroom environment conducive to student learning and student attention to academic tasks (Brophy, 1979, 1983a; Cooley & Lenhardt, 1980; Emmer, Evertson, & Anderson, 1980; Evertson & Emmer, 1982). Good and Brophy (1984) have reviewed the classroom management principles that maximize time students spend on learning tasks resulting in increased student achievement. Effective managers show three major clusters of behavior: behaviors that teach students appropriate conduct, skills in diagnosing students' engagement rates, and behaviors that convey purposefulness. Effective classroom procedures are aimed at preventing classroom disruptions.

Behaviors that teach students appropriate conduct. Several studies indicate that the first few weeks of school are critical for establishing effective rules and efficient routines that serve as guidelines for student behavior for the remainder of the school year (Anderson, Evertson, & Emmer, 1980; Emmer et al., 1980; Evertson, Emmer, Sanford, & Clements, 1983). Even with older students (i.e., junior high age), effective managers review behavioral expectations at the beginning of the year (Evertson & Emmer, 1982).

Effective managers directly teach conduct and housekeeping guidelines as well as learning-related behaviors such as how to read and follow directions for seatwork, how to line up, how to get the teacher's attention, and how to use the learning center (Anderson et al., 1980). Effective managers differ from less effective managers in the degree to which they provide modeling, rule rehearsal, and feedback to students regarding rules and expectations (Anderson et al., 1980; Emmer et al., 1980). Effective classroom managers demonstrate or model discriminations to be learned (e.g., talking softly vs. talking loudly). Brophy (1983a) suggests that effective teachers in well-managed classrooms actually use "semi-formal" lessons similar to the teaching of academic lessons to instruct students in classroom rules and routines. Monitoring student behavior involves use of praise to reinforce the continued use of an appropriate rule or routine, and immediate reteaching when inappropriate or undesired behavior occurs. Specific corrective feedback rather than criticism or threat of punishment is stressed.

The Classroom Management Improvement Study (Evertson et al., 1983) evaluated the extent to which materials and teacher workshop activities help teachers establish and maintain effective learning environments. Forty-one teachers in grades 1-6 were trained in 11 aspects of classroom organization and management. Data collected during the first eight weeks of school included descriptive classroom narrative records, counts of student's on-task or off-task behavior, ratings of student success and inappropriate or disruptive behavior, logs of classroom time use, ratings of teacher use of specific instructional management techniques, and teacher interviews. Treatment teachers were rated by observers as having more efficient routines and procedures (e.g., consistently

enforces work standards, signals appropriate behavior, stops inappropriate behavior quickly, ignores inappropriate behavior) and being more consistent in managing student behavior (e.g., effective monitoring). While there was not a significant difference between the amount of disruptive student behavior or inappropriate student behavior in the two groups of teachers, results indicated that the treatment teachers had significantly higher levels of student task engagement and appropriate behavior. In addition, treatment teachers were rated as giving clear instructional presentations and explanations. This study did not address student achievement gains; however, effective classroom management has been related to student achievement (Cooley & Leinhardt, 1980; Rosenshine & Berliner, 1978).

Skills in diagnosing student's focus of attention. In addition to establishing behavioral expectations in the early weeks of school and reinforcing rules, routines, and expectations, effective managers monitor and maintain classroom management through several teacher behaviors (Kounin, 1970). These include such concepts as "withitness" (the teacher's ability to communicate to students an awareness of what is going on even when directing learning activities with a subset of students), "overlappingness" (the ability to deal with two matters simultaneously), smoothness of transitions, and "momentum" (flow of classroom activities). Through teacher position, continual scanning and eye contact with students outside the immediate lesson, teachers maintain an effective surveillance system that helps hold students accountable for their behavior during seatwork activities without interfering with the momentum of the ongoing lesson. Effective managers redirect unengaged students without disrupting the ongoing activities of the classroom by praising

task-relevant behaivors and using nonverbal signals. According to Kounin, effective managers understand that periods of student inattention tend to be fleeting when teachers provide a continuous academic signal.

Englert and Thomas (1982) applied Kounin's criteria to special education settings. Supporting Kounin's original findings, they concluded that effective group management strategies in special education led to a high level of student involvement. Effective special education teachers manage their classrooms by positioning themselves carefully and actively scanning to monitor student task involvement. Circulating among students during seatwork tasks is an important feature of their management strategy.

Effective managers also consider the needs of their students and adjust their teaching to these needs, supporting the notion that these teachers arrive at a good match. Emmer et al. (1980) note that teachers who are effective managers have a "sense of student's perceptions and needs." In contrast to other teachers, effective managers are more likely to appropriately consider attention span of students, relation of lesson content to student interest, appropriate work standards, and assurance of reasonably high levels of student success in relation to the teacher's lesson design. Thus, in addition to an understanding of management techniques, Good (1983) concludes that these teachers "possess a keen understanding of how students learn and develop" (p. 134). In a sense, the active monitoring keeps them in tune with individual student's needs.

Behaviors that convey purposefulness. "Academic press" refers to the degree to which environmental forces press for student achievement (Murphy, Weil, Hallinger, & Mitman, 1982). According to these authors, effective

managers model a task-oriented attitude for their students. They establish an academically demanding climate, conduct an orderly, well-managed classroom ensuring student success, implement instructional practices that promote student achievement, and provide opportunities for student responsibility and leadership. Findings from several studies reviewed by Brophy (1986) indicate that teachers who establish academic objectives elicit higher student achievement than teachers (a) who fail to establish clear objectives, (b) who are unable to accomplish academic objectives due to poor management skills, or (c) who establish primarily affective objectives.

Many of the necessary teaching skills for creating an academic press deal with preparation. Effective teachers devote time and energy at the beginning of the school year getting to know their students, establishing rules and procedures, setting instructional goals, and communicating clear expectations. Specifically, they plan lessons in advance, break lessons into their component parts for lesson presentations, and use large group activities to monitor student progress (Emmer et al., 1980).

The physical arrangement of the room, traffic patterns, and rules and procedures that minimize intrusions on instructional time are considered by effective managers (Brophy, 1983a). Effective managers not only alert students to the behaviors they expect but also hold students accountable for those behaviors. Students are held accountable for completing work on time and, according to Good (1983), effective managers construct classroom environments in which expectations for student behavior are "continuous." Therefore, regular times are scheduled daily to review independent work, teachers regularly circulate to check on progress during seatwork times, and completed papers are

returned promptly with feedback. These teachers maximize use of the available time for instruction and see that students learn the content. Doyle (1983) argues that accountability drives the task system and students tend to take seriously only the work for which they are held accountable.

Teacher Expectations

Teacher communication of expectations for students' performance has been found to be related to achievement in that students' interpretation of task demands depends on teacher clarity and specificity, teachers' differential treatment of students is related to high and low achievement, and student achievement is maximized when teachers expect students to master the curriculum. These teachers establish a task-oriented, academic-focused classroom. After reviewing the extensive literature on differential teacher treatment of high and low achievers, Good and Brophy (1984) identified ways in which teachers interact differently with students. These include:

- Waiting less time for lows to answer
- Giving lows answers or calling on someone else rather than trying to improve their responses by giving clues or repeating or rephrasing questions
- Inappropriate reinforcement: rewarding inappropriate behavior or incorrect answers by lows
- Criticizing lows more often for failure
- Praising lows less frequently than highs for success
- Failing to give feedback to the public responses of lows
- Generally paying less attention to lows or interacting with them less frequently
- Calling on lows less often to respond to questions
- Seating lows farther away from the teacher
- Demanding less from lows
- Interacting with lows more privately than publicly and monitoring and structuring their activities more closely
- Differential administration or grading of tests or assignments in which highs but not lows are given the benefit of the doubt in borderline cases
- Less friendly interaction with lows including less smiling and fewer other nonverbal indicators of support
- Briefer and less informative feedback to the questions of lows

- Less eye contact and other nonverbal communication of attention and responsiveness
- Less use of effective but time consuming instructional methods with lows when time is limited. (pp. 104-105)

Brophy and Good's (1970) finding that students perceived as high achievers were given three to four times more opportunities to respond than those perceived as low achievers served as the impetus for a major California research project dealing with the effects of teacher expectations on student achievement (Kerman, 1982). The project was titled Equal Opportunity in the Classroom, but is more commonly known as TESA (Teacher Expectations and Student Achievement). Teachers from 30 school districts volunteered to participate. Teachers in the experimental group received five inservice training sessions on ways to implement 15 teaching practices aimed at interacting with all students in an equitable manner. Ongoing consultation and feedback were provided. About 2,000 low achievers in experimental classes showed statistically significant achievement gains over their low achieving peers in control classes. In addition to academic gains, a significant reduction in absenteeism and discipline referrals, which increased students' opportunities to learn, were found. Training teachers in the use of strategies for interacting with low achievers resulted in increased performance for all students. While the project's focus was on students perceived as low achievers, all students in the experimental classes, not just the lows, showed significant gains over their counterparts in control classes.

The researchers concluded that students are not similar physically and mentally, but all have the right to an equal opportunity to learn. During inservice training, teachers identified protecting the student from

embarassment, assisting the whole class to hear a good answer, and the need to cover curriculum content as reasons for treating low achievers differently.

An important aspect of establishing goals and objectives relates to teacher expectations or anticipated student performance. Research tends to substantiate that teaching with goals and objectives relates positively to instructional quality and student achievement (Hartley & Davies, 1976), in part, by structuring evaluation activities (Bloom, 1976). Fuchs, Fuchs, and Deno (1985) explored how student achievement relates to ambitiousness of goal setting and to goal mastery for 58 students classified as emotionally handicapped, learning disabled or educable mentally retarded. The average number of years these students had spent in school, excluding kindergarten, was 5.7 years and ranged between 2 and 9. Teachers were trained in specific procedures for establishing and monitoring student progress toward IEP goals. Goal ambitiousness was defined by comparing students' baseline performance in reading to the level of anticipated performance stated in the goal. Findings indicated that goal ambitiousness is associated positively with student achievement. Specifically, moderately to highly ambitious goals were associated with better achievement on three qualitatively different measures of reading: The Structural Analysis subtest of the Stanford Diagnostic Reading Test, a test of decoding skills; the Reading Comprehension subtest of the Stanford Diagnostic Reading Test, a measure of reading comprehension, and the Passage Reading Test, an index of reading fluency.

Goal mastery was not related to student achievement and there were no significant interactions between the ambitiousness of goals and other factors, indicating the effect of goal ambitiousness on student achievement was not

mediated by the students' special education classification or goal mastery. The authors conclude that special education practitioners need to "establish relatively ambitious expectations to stimulate greater achievement" (p. 68) and to reconceptualize how and why they use goals. They recommend the use of goals to improve the quality of instruction and feedback to students by using a data-based formative evaluation approach to monitor student progress and trigger needed changes in the instructional program. Direct and frequent measurement, or a data-based approach to monitoring student progress is more effective in increasing student achievement than simple informal teacher observations of students' progress (Fuchs, Deno, & Mirkin, 1984; Fuchs, Fuchs, & Warren, 1982; Zigmond & Miller, 1986).

Instructional Clarity

Many terms are used in the literature to describe an effective lesson presentation. Good and Grouws (1979) refer to "Active Teaching," Rosenshine (1983) refers to direct instruction or demonstrate-prompt-practice, Ysseldyke and Algozzine (1984) refer to demonstrate-demonstrate-practice-prove, and so on. All descriptions emphasize instructional clarity. Good and Brophy (1984) cite McCaleb and White's (1980) five aspects of clarity that observers can attend to and consider when describing a lesson presentation (see Table 9).

Substantive interaction is an essential characteristic of an effective lesson presentation. Within the BTES framework, substantive interaction was defined in terms of presentation of information, monitoring of student progress, and feedback about performance. High levels of substantive interaction were positively related to academic learning time. Hence, the quality of the time students spend engaged in academic work depends on the tasks they are expected

Table 9

Aspects of Instructional Clarity

1. Understanding. This is a prerequisite to clarity and involves matching the information to be learned to the learner's present knowledge. Does the teacher:

   a. Determine students' existing familiarity with the information presented?

   b. Use terms that are unambiguous and within the student's experience?

   c. Clarify and explain terms that are potentially confusing?

2. Structuring. This involves organizing the material to promote a clear presentation: stating the purpose, reviewing main ideas, and providing transitions betwen sections. Does the teacher:

   a. Establish the purpose of the lesson?

   b. Preview the organization of the lesson?

   c. Include internal summaries and a final review?

3. Sequencing. This involves arranging the information in an order conducive to learning, typically by gradually increasing the difficulty or complexity of the material. Does the teacher order the lesson in a logical way, appropriate to the content and the learners?

4. Explaining. This refers to explaining principles and relating them to facts through examples, illustrations, or analogies. Does the teacher:

   a. Define major concepts?

   b. Give examples to illustrate these concepts?

   c. Use examples that are accurate and concrete as well as abstract?

5. Presenting. This refers to volume, pacing, articulation, and other speech mechanics. Does the teacher:

   a. Articulate words clearly and project speech loudly enough?

   b. Pace the various sections of the presentation at rates conducive to understanding?

   c. Support the verbal content with appropriate nonverbal communication and visual aids?

Note: From Looking in classrooms (p. 338) by T. L. Good and J. E. Brophy, 1984, New York: Harper and Row.

to accomplish and the extent to which students understand what they are doing. This may be particularly important for students with learning problems, who need instruction to include "explicit attention to meaning" (Doyle, 1983). Good and Brophy (1984) reported that slow learners require opportunities to deal actively and extensively with difficult material, by responding frequently and using the material to the point of overlearning to produce achievement gains. Many individuals have noted the effect of how teachers present information, query students, and provide feedback on student achievement.

Giving information. Students achieve more in classes when their teachers' presentations are clear, sufficiently redundant, well sequenced (Brophy, 1986), and delivered with enthusiasm (Brophy, 1986; Good & Brophy, 1984). Achievement is maximized when lessons begin with overviews, review objectives, call attention to main ideas and essential concepts, and review main points and procedures. Teachers' clarity in presenting information is influenced by their effectiveness in classroom management. Emmer et al. (1980) studied 14 third grade teachers, seven of whom were effective managers and seven of whom were ineffective managers. Although the students in all teachers' classes did not differ at the beginning of the year on aptitude or achievement tests scores, throughout the school year, the students in the effective managers classrooms showed greater on-task behavior, and by the end of the school year, showed greater achievement gains than did the students in the ineffective manager's classes. The two groups of teachers differed in several ways characteristic of instructional/teaching behaviors. The more effective managers communicated objectives, directions, and content more clearly, adapted instruction to students' interests, skill levels and attention spans, and explained to students

why they were learning particular material or content. Being clear and monitoring students are important instructional strategies for which efficient classroom management may be a prerequisite or, minimally an advantage.

Recent research within the reading comprehension area (Duffy, Roehler, Meloth, Vavrus, Book, Putnam, & Wesselman, 1986; Pearson & Dole, in press) highlights the importance of explicit instruction. Pearson and Dole (in press) define instruction as explicit if a student knows what the skill to be learned is, how to apply the skill, why to use the skill, and when to use the skill. In their review of 60 separate studies comparing explicit approaches to teaching comprehension skills with the more conventional approach of mentioning-practice-assessment, they found student performance on practice and application activities to be superior when teachers take the time through extended discussions to make clear to students the what, how, why, and when of the skills. The studies reviewed included training both elementary (Gordon & Pearson, 1983; Hansen, 1981) and junior high students (Palincsar & Brown, 1984) in the use of specific strategies for improving reading comprehension. Students who received training in the use of specific strategies (i.e., explicit instruction) reflected greater student achievement gains; in most cases, the effects have proven to be durable over periods ranging to six months.

Paris and his colleagues (Paris, Cross, & Lipson, 1984) have developed an explicit comprehension program including metacognitive awareness and comprehension monitoring. Third and fifth grade students were trained to improve their control over and understanding of the goals of reading, strategies for comprehension, and strategies to correct comprehension failures. Teachers used instructional procedures derived from the work on direct instruction in a

specific order: a concrete example was provided, application of the example was provided, frequent discussion of the objective of each example was given, significant teacher-student discussion focused on the application of the comprehension principle and increased opportunity for practice and feedback related to each principle occurred. Performance of the experimental group exceeded that of the control group on measures of strategy knowledge and use, criterion-referenced measures of reading comprehension, and standardized reading achievement test scores. The high level of student involvement and interaction were discussed as a primary reason for the success of the experimental group over the control group.

According to Pearson and Dole (in press), the success of explicit training procedures for low achievers is perhaps the "critical element" often missing in instruction. They suggest that modeling is something the teaching profession has known about for a long time and independent practice is the teaching profession's "forte." They propose that "in a sense, instruction can be conceptualized as what happens in those intermediate stages between total teacher responsibility (modeling) and total student responsibility (practice or application)" (p. 9).

The cognitive aspects of the teacher's verbal explanation of the lesson content is underscored by several researchers. Tobias (1982) and Rohrkemper and Bershon (1984) view the teacher's role as one of instructional support for increasing students' metacognitive knowledge. According to these researchers, teacher assistance in organizing instruction content, maintaining student attention, eliciting student responses, and providing feedback is essential for developing thinking in students.

The relationship between teachers' explicit explanations and student cognitive processing of lesson content was examined by Duffy et al. (1986). Seven fifth-grade teachers volunteered to participate in training to improve explanations during reading skill instruction. After each training session, researchers observed the teacher instructing the low reading group. In addition, five randomly selected low group students were interviewed to assess their awareness of what was taught, when to use it, and how to do it. Observers also rated student engagement to ensure that time on task was approximately the same in all classrooms. Results support the researchers' hypothesis that explicit teacher explanations are associated with high achievement and high awareness of lesson content. The seven teachers met the criteria for verbal explicitness and there were no differences in student engaged time, but there were qualitative differences in teachers' instructional talk which, in turn, were reflected in students' understanding during post-instruction interviews.

A qualitative analysis of three pairs of lessons taught by two teachers trained to explain the use of context clues in figuring out word meanings serves as an example of the subtle differences in teacher talk and, subsequently, in what students remember about lesson content. First, the teachers conveyed different information about what was to be learned and they provided different kinds of verbal assistance. The least effective teacher used labels (i.e., context clues) and emphasized a rigid sequence of steps with no explicitly stated connection between one step and the next. In contrast, the more effective teacher mentioned the label "context clues" only as a backdrop to learning how to figure out unknown word meanings. In addition, the effective teacher talked about her thoughts when using the strategy and described the

meaning-getting process (i.e., put the clues together with what you already know about that word and decide on the meaning). The least effective teacher began the lesson with a lengthy questioning session often questioning students about where the clue words were but never telling them what clue words were, where to find them, or how to use them. In contrast, the verbal assistance provided by the more effective teacher specified a step-by-step description of the process one goes through when using context clues. This teacher tried to make visible her "invisible" mental reasoning.

Second, the two teachers responded differently during interactions with students. The effective teacher elaborated students' answers, providing additional models for how to reason using context clues, whereas the less effective teacher tended to use commercially prepared materials. Third, student understanding of the lesson mirrored the teacher's talk. For example, those students of the less effective teacher described that they learned "about context clues" and were able to articulate several steps; in contrast, those students with the more effective teacher described the mental processes they employ in using context clues. The researchers concluded:

> It is not enough to simply be explicit. Explicitness is a relative term, and includes a broad range of qualitative interpretations. Both teachers in each pair were explicit in the sense that they were definite and clear about the lesson topic and about the need to specify how to do it. However, they differed in their conceptual interpretation of what learning that lesson topic meant and what process good readers utilize when performing it. (p. 248)

Questioning students. While the findings on difficulty level of questions are mixed, it seems clear that around 75% of teacher questions should be answered correctly by the first respondent (Anderson et al., 1979; Brophy, 1986) and that the rest should elicit incorrect or incomplete answers rather that

failures to respond (Anderson et al., 1979). Optimal teacher questioning varies with classroom context. Basic skills instruction requires drill, practice, and fast-paced review in which questions are answered quickly and correctly. But, teaching students to generalize, evaluate, or apply their learning may require teachers to ask questions that have no single correct answer. Bennett et al. (1984) argue that timing and the quality of teacher questions are as important as frequency of student errors. Frequent errors may be appropriate early in a unit, while errors should be minimal during the mastery stage, ideally at the end of the unit.

Findings on the cognitive level of questions are inconclusive. However, several studies show that the frequency of questions is related to learning (Brophy & Evertson, 1976; Soar, 1973; Stallings, 1975; Stevens & Rosenshine, 1981). Higher level questions (e.g., analysis, evaluation) have not been found to be better than lower level questions (e.g., knowledge, comprehension). In fact, lower level questions are more frequent and have been found to facilitate learning of higher level objectives (Brophy, 1986). Frequency of questions may be an academic correlate because teachers with high rates of academic questioning tend to have well managed classes and spend much time actively teaching. Good and Brophy (1984) found they supplement lectures, demonstrations, reading, and seatwork activities with recitations, discussions, and opportunities for students to express themselves.

Providing feedback. Teachers who provide regular and extensive feedback elicit higher achievement (Brophy, 1986). According to Brophy (1986), findings on teacher feedback to student responses are weaker and less consistently replicated than findings on lesson presentation or teacher questioning. Yet, it

is known that acknowledgment of correct responses is important and positive feedback does not require excessive praise; in fact, neutral, task specific praise is related positively to student achievement. The relationship between frequency of praise and achievement is usually quite low and sometimes negative (Brophy & Evertson, 1976; Stallings, 1975). Praise is more effective when it is specific, used with dependent or anxious rather than confident students, and delivered in ways that focus on the achieved product rather than on the recipient. Teachers of higher achieving students discourage irrelevant student questions, and respond positively to relevant questions by answering them, redirecting them to the class or incorporating them into the lesson presentation. Thus, characteristics of effective praise include primarily immediacy, task specificity, and maintaining an academic focus; less emphasis is placed on frequency.

The most critical aspect of effective feedback is the degree to which it enhances student opportunity to respond. Emmer et al. (1980) found differences in management of feedback by more and less effective teachers; specific differences appear in Table 10. Anderson et al. (1979) found that first graders who were higher achieving in reading received sustaining rather than terminal feedback. Sustaining feedback sustains the interaction between teacher and student through teacher rephrasing of questions or provision of cues or prompts. Teachers using terminal feedback end interaction by giving the student the answer or calling on someone else. Individuals (Brophy & Evertson, 1976; Good, Ebmeier, & Beckerman, 1978) caution that continued attempts to elicit an accurate response may result in "pointless pumping." Students who received more teacher explanation in response to their specific questions and needs achieved

Table 10

Differences in Management of Feedback

Variable	More Effective Teacher	Less Effective Teacher
Process questions	5.91[a]	1.29
Product questions	17.42	6.95
Correct answer praised by teacher	4.26	.32
New question after correct answer	2.93	.25
Correct answer integrated into discussion	3.25	.60
Correct answer -- no feedback	.38	.06
Wrong answer -- teacher criticizes	.01	.01
Wrong answer -- new teacher question	.41	.07
Wrong answer -- process feedback	.28	.09
Wrong answer -- teacher gives answer	.72	.27
Student-initiated comments given feedback	1.00	.28

[a]Numbers indicate the average frequency in a 50 minute period

Note: From "Effective classroom management at the beginning of the school year" (pp. 219-231) by E. T. Emmer, C. M. Evertson, and L. M. Anderson, 1980, Elementary School Journal.

less in the BTES study (Denham & Lieberman, 1980). These situations may indicate a poor instructional match; therefore, increased opportunity for student response was negatively associated with achievement (Brophy, 1986).

In sum, the literature on instructional clarity is supported by Samuels' (1986) identification of critical factors for students mastering basic skills in education. First, he underscores the importance of the "language" of instruction, including concepts and vocabulary, modeling of the process, and asking students questions about the process in which they are engaged in order to understand the task. Second, he stresses the importance of practice, specifically beyond accuracy to automaticity. Third, metacognitive knowledge, which he defines as the student's awareness of his/her thinking processes and the ability to use this awareness to govern and control his/her activities, is essential.

Characteristics of Effective Instruction in Special Education Classrooms

Studies of teaching, classroom processes, and instructional variables have been conducted primarily with regular education students or low achieving, disadvantaged students. Only recently, studies have focused on special education populations, and a special issue of Exceptional Children (Algozzine & Maheady, 1986) focused on instruction that works in special education classrooms. Additional articles are included in a subsequent issue (Exceptional Children, 1986, No. 53). This section reviews the characteristics of effective instruction and the empirical basis for several programs and systematic procedures for special education students.

General Characteristics of Effective Instruction

Bickel and Bickel (1986) have sorted the complex set of findings about effective classrooms and instruction into three broad categories: teaching behaviors, organization of instruction, and instructional support. The principles of effective instruction in special education classrooms are similar to the principles of instruction in mainstream classrooms. In addition, results from classroom observations of 40 self-contained special education classrooms indicated no differences in the nature of instruction for LD, EBD, and EMR students (Algozzine, Morsink, & Algozzine, in press). The authors concluded that special education teachers were using effective teaching procedures but were "not performing differently relative to the type of student in their self-contained special classrooms" (p. 11). Basic skills achievement is the central outcome measure for judging the effectiveness of a program, procedure, or practice. Characteristics of effective instruction in special education follows.

1. **Effective instruction in special education classrooms involves substantive teacher-student interaction under direction of the teacher.**

Effective teachers in special education classrooms give redundant instructions and explanations, provide ample guided practice, check for student understanding by questioning, review homework and the previous lesson consistently, and provide meaningful feedback that reteaches or positively reinforces students' accurate responses. These behaviors are implemented efficiently by structuring the learning process and managing time. An effective special education teacher is active and directly involved in the teaching-learning process (Sindelar, 1986).

2. Effective instruction in special education classrooms focuses on making decisions to maximize student success and academic engaged time (Semmel, Lieber, & Peck, 1986).

Decisions about the use of time, the pace of instruction, the way the curriculum is structured and delivered, the way students progress through the curriculum and the way students are grouped for instruction affect the organization of instruction and basic skills outcomes for students. While academic learning time (Berliner, 1984) is emphasized, the notions of "content overlap among teaching, learning, and criterion (Leinhardt & Pallay, 1982), mastery learning built into the structure of the curriculum, and a brisk pace are equally considered. Pacing is a critical instructional variable in special education classrooms because it helps achieve the balance required between progress through the curriculum and attainment of high levels of mastery.

Many studies in recent years have focused on the importance of the teacher as a manager of academic learning time and student task involvement (e.g., Wyne & Stuck, 1982). A pilot study by Englert and Thomas (1982) examined classroom management and instructional practices that facilitate student task involvement in the special education setting. Students with higher rates of task engagement had teachers who planned shorter but more frequent lessons per hour, used teacher positioning and eye scanning to monitor the whole class, and reinforced acceptable behavior contingently and appropriately. These teachers circulated throughout the room during transition periods to answer questions and monitor student behavior. In a subsequent study, Englert (1984) investigated how principles of direct instruction (e.g., pacing, success criteria, and feedback) related to academic gains for 52 learning disabled and educable mentally

handicapped students. A "learning score" was calculated for each pupil based on the student's median achievement per week and was used to determine which teachers had been most effective in producing academic gains. The results revealed that effective teachers maintained a quicker instructional pace, elicited more correct responses, used prompts more often to encourage correct answers, maintained student accuracy above 80%, and used lesson objectives, concrete examples and error drill more frequently. Other techniques that proved effective included reviewing the previous day's activities, having students verbalize the concept rule, precueing or prequestioning to elicit high correct responding, providing repeated practice opportunities on troublesome concepts, and teaching a small subset of skills for several days before introducing a new set of skills. Englert argues that the assumption that individual needs are best met through independent activities and one-on-one instruction can be questioned in the light of this research.

Grouping decisions have a positive effect on academic outcomes when specific conditions are met. Specifically, Bickel and Bickel (1986, p. 494) summarize positive academic benefits for students when the following conditions are met:

- Number and size of groups are dependent on student characteristics and content taught.
- Different groupings are used for different subjects.
- Frequent shifts among groups occur during the school year as well as between years.
- Groups are based on current levels of specific skills.
- There is a combination of small group and whole class instruction.
- Groupings are responsive to instruction.

Conversely, negative effects on student performance can result when grouping practices are held constant across subject areas, when they are based on testing prior to instruction, and when they are static and influenced heavily by perceptions of general ability.

3. Effective instructional planning in special education is data based.

An essential principle of effective instruction for educators in general and special educators in particular is appropriate assessment for instructional planning. Zigmond and Miller (1986) support a data-based approach to select specific instructional goals and objectives, to monitor student progress, and to make changes in the instructional program. Both White's (1986) concept of precision teaching and Deno's direct and frequent measurement procedures (Deno, 1986) provide methods for systematically evaluating the curriculum or instructional procedure employed. These individuals all stress that monitoring what the student is taught and the effectiveness of the instructional procedures is more important than where the student is taught.

4. The development of student accountability is an important characteristic of effective instruction in special education classrooms.

Anderson-Inman (1986) argues that special educators need to develop student-centered strategies for promoting transfer of learning from resource to mainstream classrooms. Her work has been successful with students in upper elementary grades and above. Fowler (1986) has developed peer-monitoring and self-monitoring procedures to assist kindergarten teachers in classroom management of special education students. Implementation of these procedures reduced disruption and nonparticipation during transition activities for kindergarteners with behavior and/or learning problems. Learning strategies

developed by the University of Kansas Institute for Research in Learning Disabilities (Deshler & Schumaker, 1986) have been effective in teaching handicapped adolescents "how to learn," and thereby enabling them to more effectively cope independently with increased curriculum demands. In a series of studies assessing the effectiveness of strategy training, adolescents consistently employed the strategies and demonstrated marked improvement in reading comprehension. The strategies currently are being adapted for use with students in upper elementary grades.

Effective Programs Data

The focus of this section is on programs that yield positive academic outcomes for special education students. Exemplary Center for Reading Instruction (ECRI), Direct Instruction (DI), classwide peer tutoring, and cooperative learning are four empirically documented effective approaches for increasing academic outcomes for students in mainstream and special education classrooms. ALEM is an empirically documented approach for handicapped students in mainstream classrooms. In addition, both cooperative learning strategies (Johnson & Johnson, 1986) and peer social initiation interventions (Strain & Odom, 1986) have resulted in positive social and behavioral changes for handicapped students, many of whom are young and severely disabled.

ECRI. The positive benefits of ECRI teaching strategies are well documented (Reid, 1981, 1986). Studies of ECRI found that student learning increased when (a) students are provided with increased amounts of quality instructional time, (b) teachers positively reinforce their students for increasing oral speed and accuracy, (c) students' overt, accurate, and rapid responses are increased, (d) teachers provide much supervised practice and

require high levels of mastery, (e) teachers check student responses and provide cues more frequently, (f) language activities are integrated with reading, and (g) instruction follows a demonstrate-prompt-practice sequence. Although the strong data base for use of ECRI procedures primarily involve regular education students, recent data suggest that ECRI is effective with compensatory and special education students as well. After seven months of ECRI instruction, handicapped and nonhandicapped students attending ECRI's Reading Clinic scored higher on the California Achievement Test. The gains for oral reading ($\bar{X}$ = 2.6 years, range: 1.2 - 6.4 years), comprehension ($\bar{X}$ = 2.4 years, range: 1.2 - 5.2 years), and vocabulary ($\bar{X}$ = 2.6 years, range: 1.1 - 7.7 years) are impressive. In addition, students receiving ECRI instruction made twice the achievement gain when compared to their progress when receiving Chapter I instruction.

Direct instruction. Direct Instruction (Gersten et al., 1986) differs from "direct instruction," a term introduced by Rosenshine (1976) and continously described in the literature as a set of effective procedures for low achieving students (Rosenshine & Stevens, 1984). Direct Instruction, a comprehensive system of instruction, refers to procedures developed by Engelmann and his colleagues (Becker et al., 1981), implemented in Project Follow Through, and published as Distar materials. Direct Instruction materials are (a) designed in a clear, unambiguous way, (b) teach an explicit step-by-step strategy, (c) develop mastery at each step, (d) develop corrections for student errors, (e) gradually fade from teacher-directed to independent work, (f) emphasize systematic practice, and (g) use cumulative, frequent review. The success of these procedures with handicapped students has been attributed to the mastery requirements at a 95% accuracy rate before proceeding to the next lesson. Many

authors (e.g., Brophy & Good, 1986; Rosenshine & Stevens, 1984) underscore the importance of high student success (especially for low achieving students). Direct Instruction provides a systematic means for achieving this objective.

The effectiveness of the Direct Instruction program is well documented (Gersten et al., 1986). Project Follow Through, a longitudinal evaluation of different instructional models on low income students' achievement in the primary grades, found that the Direct Instruction program had a beneficial effect on the students' math, language, spelling, and reading achievement. The achievement of low income students who participated in the Direct Instruction program from kindergarten through third grade was at or near the national median. Analysis of the data for students with IQs of 71 to 90 taught in mainstream classrooms revealed one year's growth for each year in school. The authors concluded that the Direct Instruction teaching techniques are an effective mainstreaming model for children considered "at risk" or even mildly handicapped. In subsequent studies the effectiveness of the program for teaching handicapped adolescents language and reading comprehension and severely handicapped students independent living skills has been documented.

Classwide peer tutoring. Classwide peer tutoring (Delquadri, Greenwood, Whorton, Carta, & Hall, 1986) increases students' "opportunities to respond" to academic material, has been used successfully in key academic skill areas (i.e., oral reading, answering comprehension question, practicing math facts, and spelling word lists, and learning vocabulary definitions), and is grounded in behavior analysis principles, particularly reinforcement for correct responding both from the teacher and peers. The procedures have been implemented in both regular and special education settings. Studies examining the effects of

classwide peer tutoring have included single subject and experimental-control group designs and have been conducted primarily with elementary age inner-city Chapter I and special education students (i.e., LD, EBD, EMR, autistic, hearing impaired). With the use of classwide peer tutoring students demonstrated increased academic gains in spelling, reading, mathematics, and vocabulary. In general, teacher, parent, and student satisfaction with the procedures was rated high.

Cooperative learning. Cooperative learning (Johnson & Johnson, 1986) is characterized by positive interdependence, individual accountability, collaboration, and group processing. When handicapped students are mainstreamed and cooperative learning strategies are implemented, positive relationships between handicapped and nonhandicapped elementary age students result. Compared to competitive and individualistic learning experiences, cooperative learning results in higher levels of self-esteem, greater achievement, more intrinsic motivation, and increased perspective taking for students. Finally, students achieved more in cooperative than in competitive or individualistic learning structures. A meta-analysis conducted by Johnson, Maruyama, Johnson, Nelson, and Skon (1981) and reported by Johnson and Johnson (1986) indicated the superiority of cooperative learning situations for promoting positive academic outcomes for students regardless of age, ability, subject area or learning task.

ALEM. Although there are many adaptive education programs (e.g., Wang & Lindvall, 1984), the Adaptive Learning Environments Model (ALEM) is the most heavily researched and is an example of recent approaches to adaptive education (Wang, Gennari, & Waxman, 1985), it aims to provide school learning experiences that effectively accommodate the needs of individual students in regular

classroom settings. The objectives of ALEM are to foster all students' successful acquisition of basic academic skills and to develop their competence and self-confidence in handling the social and intellectual demands of schooling. The program is not constrained to any one teaching method, but stresses incorporating a wide variety of skills mastery techniques in addition to techniques that foster independent inquiry and social cooperation.

Based on the integration of aspects of prescriptive instruction that have been shown to be effective in facilitating mastery of basic skills (Bloom, 1976; Rosenshine, 1979), ALEM consists of eight program dimensions that are considered to be essential for an effective adaptive program: (a) creating and maintaining instructional materials; (b) record keeping; (c) diagnostic testing; (d) prescribing; (e) monitoring and diagnosing; (f) interactive teaching; (g) instructing; and (h) motivating. Four additional program dimensions are critical for supporting program implementation at the classroom level: (i) arranging space and facilities; (j) establishing and communicating rules and procedures; (k) managing aides; and (l) developing student self-responsibility. Finally, four dimensions provide school and district level support for the implementation of adaptive instruction programs: (m) multi-age grouping; (n) instructional teaming; (o) personnel preparation; and (p) parent involvement.

Wang (1984) is particularly concerned about productive time-use in schools and the relationship to improvement of student learning and achievement. A major emphasis of her work with ALEM has been:

> the development of programming strategies that effectively decrease the amount of time needed for learning by individual students, while at the same time increase both the amount of time teachers are able to spend on the provision of adaptive instruction and the amount of time students actually spend learning. (p. 169)

Wang (1984) reports a study investigating the extent to which ALEM's critical dimensions can be implemented and the relationships between the degree of program implementation, time allocation and use, classroom processes and student achievement and attitudes. The study was conducted in 138 kindergarten to third grade classrooms where ALEM was implemented as the primary educational program. Ten school districts participated; six districts implemented ALEM in conjuction with a compensatory education emphasis, whereas the remaining four sites implemented ALEM as a program for mainstreaming mildly handicapped and gifted students in regular classrooms.

The results supported the general belief that there is a relationship between the extent to which the critical dimensions of ALEM are implemented and the nature of the classroom processes. In high level implementation classrooms, students and teachers exhibit more of the classroom processes the program is designed to achieve. Specifically, there is greater instructional teacher-student interaction, more constructive peer interaction, and more on-task behavior as compared low level implementation classrooms. With regard to time use by teachers, larger percentages of teachers' time is spent on instruction-related activities in ALEM classes; only a very small proportion of non-instructional time was spent on behavior management. For handicapped students in ALEM classes, teachers spent more time prescribing work and less time on personal conversations. With regard to findings on student achievement in the basic skills, regular students in ALEM mainstreaming classes achieved as well in reading and math (as measured on norm-referenced test and curriculum-based measures) as similar students in non-ALEM comparison classes. In contrast, achievement gains in reading and math of handicapped students

favored those in ALEM settings. The results also indicate positive attitudinal outcomes; ALEM handicapped students showed higher self-ratings of cognitive and social competence than handicapped students in the non-ALEM classrooms.

The results contradict the common argument that adaptive education programs result in students working alone most of the time, lower time on task, and lower rates of achievement than traditional classrooms. In this study, classroom processes (e.g., time on task, instructional teacher-student interactions) identified in the effective instruction literature were attained under ALEM.

Semmel et al. (1986) offer a parsimonious, programmatic characterization of effective special education environments. Characteristics that typify effective instruction in terms of academic achievement have:

1. High student instructional engagement.
2. Rigorous teacher monitoring of student activity.
3. Regular teacher feedback to students.
4. Well-sequenced learning tasks that are appropriate to the learner's achievement level, and broken into incremental steps.
5. Clearly specified performance requirements.
6. Minimization of transition, management time, and activities indirectly related to academic performance. (p. 174-175)

An important issue for handicapped learners relates to total programming or coordination between regular and special education environments. It is likely that many of the above listed characteristics may be difficult, if not impossible, to implement in mainstream settings where there is extreme variability in students' skill levels. Although class size differences do not guarantee success, Bickel and Bickel (1986) note that smaller classes do positively affect the teacher's implementation of principles of effective instruction and allow for more teacher-student interaction. Classroom management strategies identified as effective for special education students (Englert & Thomas, 1982) may be impossible to implement in the mainstream when

many students work at very different levels to maintain a high success rate. The challenge lies in developing interventions appropriate to meet all students' needs. Research on the effects of adaptive instruction offers promise and direction in meeting this goal (Waxman et al., 1985).

In closing, Bickel and Bickel (1986) caution that findings about instructional effectiveness in special education classrooms need to be viewed with qualification. The implementation of the findings could result in a very narrow curriculum, one emphasizing basic skills acquisition exclusively. Some relationships are not well understood for handicapped learners. For example, little is known about the relationship between instructional variables and achievement with higher order thinking skills and acquisition of social skills.

Summary

There is no single definition of effective instruction. Anderson (1984b) contends, however, that the key instructional elements are relatively few in number and surprisingly compatible. He states:

> Effective instruction from the point of view of increasing time on-task may proceed something like this: First, tasks should be chosen which are at an appropriate level of difficulty for the students. Second, the task should be communicated directly to the students. That is, students should know (a) what they are to learn, and (b) how they are to demonstrate that learning. Third, behavior settings and learning activities which have a high degree of continuity should be chosen (for example, activities involving small groups working on a common goal, activities in which students must make or do something, activities in which the materials are continously present, and teacher-demonstration activities). Fourth, teachers (or other adults) should monitor the learning. Such "monitoring" would involve, among other things, pacing the learning of the students and indicating the nature and purpose of transitions between activities. Fifth, behaviors such as those described in the categories of withitness, smoothness, momentum, and group learning should be exhibited by the teacher during activity in which he/she has a direct involvement (such as recitations or classroom discourse) and during the monitoring of activities during which he/she is not directly involved (such as seatwork). Sixth, appropriate task-oriented behaviors on the part of the student should be

> reinforced. Seventh, feedback should be given to students concerning their attainment of the specified tasks. Eighth, and finally, errors and misunderstandings of students should be corrected before they are allowed to accumulate and interfere with subsequent learning. In general, instruction of the nature described above will result in high levels of student time on-task. (pp. 158-159)

While there is no single definition of effective instruction, it is clear that there is not a definition for mainstream classrooms and another defintion for special education classrooms. Effective instruction is effective instruction regardless of the setting. Rosenshine (1983) adds, "now that we can list the major functions or components which are necessary for systematic instruction, we can turn to exploring different ways in which these functions can be effectively fulfilled" (p. 350). Successful teaching models, programs, teachers, and instructional approaches share common characteristics (in both mainstream and special education settings). Different methods by different teachers in different classroom contexts may be used to implement these common characteristics. The differences appear to lie in implementation rather than in the common set.

The complexity of implementing effective instruction lies in being able to do so for all students, particularly when skill level ranges and prior knowledge of students vary extensively in some classrooms. Good and Brophy (1984) caution that it is impossible to specify how teachers should instruct or behave with complete detail. They state:

> Although classroom research continues to develop support for instructional principles of varying generality, there are no generic methods that are best for all types of students and situations. Different learning objectives (mastering well defined knowledge or skills vs. applying them to complex problem solving or creativity, for example) require different instructional methods, and progress toward other kinds of objectives (promoting the personal development of individuals or the social development of the class as a group) requires still other methods. Research can inform teachers about the relationships between teacher behavior and student outcomes, but teachers must decide for themselves what outcomes they wish to promote and in what order of priority. (p. 327)

Hawley and Rosenholtz (1984) caution that there are no quick fixes for ensuring teaching effectiveness, despite the researchers identification of practices and behaviors that constitue a technology of effective teaching. With regard to teaching effectivenes, they note:

> There is no one best instructional system, no quick fixes, and no universal criteria of teacher excellence that can be applied in all contexts, with all students, for all goals of academic learning. Instead, it seems clear that in selecting appropriate instructional strategies, one must consider both the nature of the student population served, particularly in regard to its academic heterogeneity, and the learning objectives to be accomplished. (p. 51)

The challenge lies in developing instructional strategies and allocating sufficient resources for teachers to provide effective instruction to mildly handicapped students and nonhandicapped students simultaneously. Planning instruction by identifying the teaching objective in relation to all students' skill levels and prior knowledge is a necessary first step. Selecting appropriate materials, maintaining academic engaged time rates, and monitoring student performance are ongoing teacher behaviors needed to achieve the teaching objective. The challenge lies in planning for the instructional match. An appropriate instructional match may be defined by tasks not assignments. According to Posner (1982), a task is a set of goal-directed activities that lead to a specified learning outcome. Tasks must be actively monitored by teachers and appropriate adjustments made in order to reach the learning outcome.

Hawley and Rosenholtz (1984) identify the pivotal role of resources -- particularly human resources -- in helping students to learn. Because the basic characteristics of effective instruction are similar in regular or special education and the challenge lies in implementation of these characteristics,

which are often contexually-determined, we believe professionals in the school need to merge regular and special education services to be more responsible to individual differences.

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